

## Service Manual

HP DesignJet 430  
HP DesignJet 450C  
HP DesignJet 455CA  
Printers

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**WARNING**

The procedures described in this manual are to be performed by HP-qualified service personnel only.

**Electrical Shock Hazard**

Serious shock hazard leading to death or injury may result if you do not take the following precautions:

- Ensure that the ac power outlet (mains) has a protective earth (ground) terminal.
- Disconnect the Printer from the power source prior to performing any maintenance.
- Prevent water or other liquids from running onto electrical components or circuits, or through openings in the enclosure.

**Electrostatic Discharge**

Refer to the beginning of Chapter 8 of this manual, for precautions you should take to prevent damage to the Printer circuits from electrostatic discharge.

**Safety Symbols**

General definitions of safety symbols are given immediately after the table of contents.

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# Service Manual



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HP DesignJet 430  
HP DesignJet 450C  
HP DesignJet 455CA  
Printers

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## Purpose

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( +/\$ %3, ! , ( "/\$ -

## Readership

# \*,) / , - - , \$ \$( .#\$- ' (/ & , .) \* ,!), ' 2 3 ,. \$!\$  
- ,0\$ \* , - )(( & )(&2

## Part Numbers

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# \* . ,

## Conventions

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## **1 Troubleshooting**

## **2 System Error Codes**

## **3 User Messages**

## **4 Service Tests**

## **5 Service Calibrations**

## **6 Image Quality**

## **7 Parts List**

## **8 Removal and Installation**

## **9 Preventive Maintenance**



## **10 Functional Overview**

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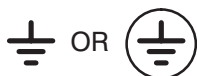
## General Definition of Safety Symbols



International caution symbol (refer to manual): the product is marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.



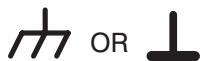
Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must also be marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal that must be connected to ground before operating equipment.



Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (operating) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment, which normally includes all exposed metal.



Alternating current



Direct current



Alternating or direct current

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**WARNING**

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The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury.



Take care not to cut yourself on the encoder strip inside the plotter.

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**CAUTION**

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The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

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## Is the Printer Using the Latest Firmware Revision?

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## Important Information

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## Important

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[illegible]

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- - ) . 1 , \* \* & . ) ( . / - . ) ' , - / - ( ( ' 0 , - ) ( .
- - . \* , ) & ' , \* , ) / & 2 2 ) /
- . ) ( & ) ' ' ( . - ) / . . / - . - . . ( .

**If the test on that component/assembly passes, you should NOT replace it.**

$$- \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} \frac{e^{-t^2}}{t} dt = 0$$

$$\begin{aligned}
 & (0, (, (.3 / \&.2 *,) \&' ** , - . - 0 - \&. ) *, (. . \\
 & , (.3 / \&.2 \&). ) \&* () - . *,) \&' , (.3 / \&.2 , (.1 \&\& \\
 & \&* 2) / , (. . .1 (*) -- \& , , , - ( ). , *,) \&' - \\
 & - / - ( ), , . , ) (.3* ( \& - \&. ) ( , 0 , ) , ) ( / , . ) ( ) , \\
 & , ( \&* ,) \&' - , ( ), ' . ) ( ) ( - ) \&0 ( , (.3 / \&.2 *,) \&' - \blacktriangleright
 \end{aligned}$$

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## What can I do if the Line Sensor has Problems Detecting Media?

1



2 Line sensor incorrectly calibrated:



3



## What can I do if the Carriage is Noisy?

1

2

3

4



## What can I do if the Cover Sensor isn't Working?

*The cover sensor is part of the front-panel assembly.*

1

2

3



## What can I do if the Carriage Assembly has problems parking in the Service Station?

1 Mispositioned trailing cable:



2



3

4

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## What can I do if the Printer continuously rejects Cartridges?

*If you are in Service Mode 1, the cover sensor is disabled. In order to test a new Cartridge set, the Printer must be powered OFF and ON again.*

**1 Remove tape and align cartridges:**

**2 Dirty pads:**



**3 Continuity Problem:**

**4 Faulty cartridge:**

**5**

**6**



**7**



**8**



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## What can I do if the Media continuously crashes?

1

2 Anti-static brush:

3



4



5

6 Missing or damaged starwheels

7 Missing Media Deflectors

## What can I do if the Printer does not Power ON?

1

2

3





---

## What can I do if the Printer has problems with Media Loading?

1

2

3

up

4



5



6



7



*Only replace one component at a time and check if the problem has been solved before replacing another component. Using this procedure you will be able to determine exactly which component failed.*

## What can I do if the Printer has problems with the Cutter?

1

- 

- 

2

- 

- 

-

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## **What can I do if the Bail Mechanism Fails?**

**1 Obstructions:**

**2 Wearing of parts:**

**3 Carriage motor control:**

**4 Bail cam:**

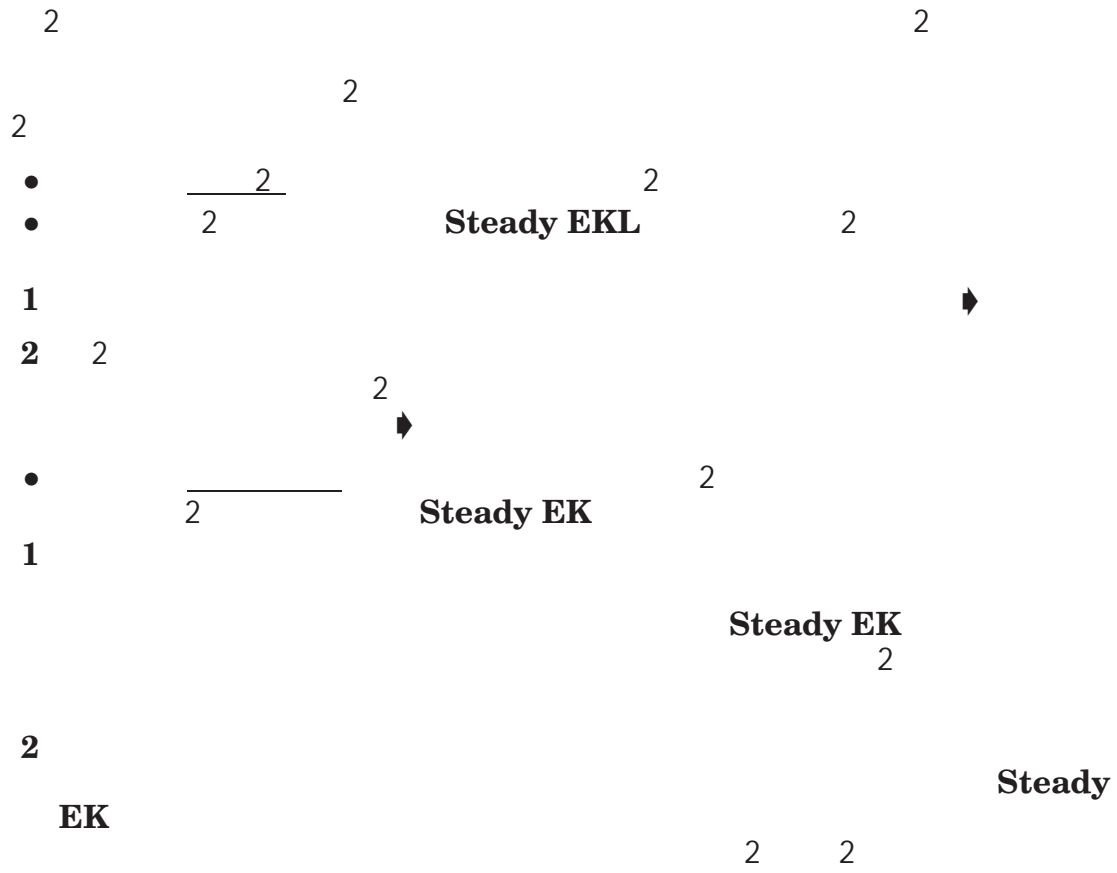
**5 Adjust carriage:**



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## **What is an EEROM error?**

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  - 
  - 
  -

*Utilities / Service Tests*

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## **Important Information on Troubleshooting Error Codes**

1

SETUP

2

FORM FEED

3

REPRINT

4

CANCEL

STATUS GROUP

D READY
E ALIGN MEDIA
F LOAD MEDIA

ERROR GROUP

K CARTRIDGES
L DATA
M MEDIA

A FAST
B NORMAL
C BEST

5

PRINT QUALITY

G PAPER
H FILM
I COATED
J GLOSSY

6

MEDIA TYPE

N ROLL
O SHEET

7

MEDIA SOURCE

○ Off
● On (Steady)
✱ Flashing

D K
E L
F M

A G N
B H O
C I
J

Flashing KLM

Steady DEL

# System Error codes

System Error Codes

HP DesignJet 430, 450C and 455CA Printers

2-3

D	○	K	●
E	○	L	●
F	○	M	●
A	○	G	○
B	○	H	○
C	○	I	○
		J	○
Steady KLM			

Cartridges + Data + Media:

CANCEL

Subcode

D	○	K	✱
E	○	L	✱
F	○	M	✱
A	○	G	○
B	○	H	○
C	○	I	○
		J	○
Flashing KLM			

Cartridges + Data + Media:

CANCEL

Subcode

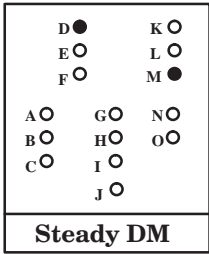
D	●	K	●
E	○	L	○
F	○	M	○
A	○	G	○
B	○	H	○
C	○	I	○
		J	○
Steady DK			

- Ready + Cartridges:
- - 
  - 
  -

D	●	K	○
E	○	L	●
F	○	M	○
A	○	G	○
B	○	H	○
C	○	I	○
		J	○
Steady DL			

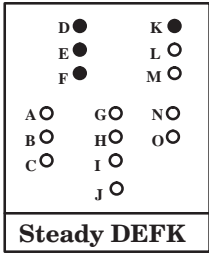
- Ready + Data:
- - 
  - 
  - 
  -





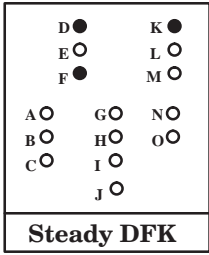
**Ready + Media:**

- 
- 
- 
- 



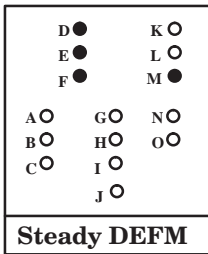
**Ready + Align Media + Load Media + Cartridges:**

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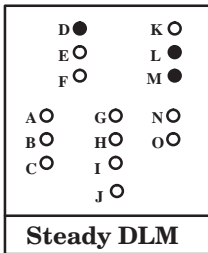


**Ready + Load Media + Cartridges:**

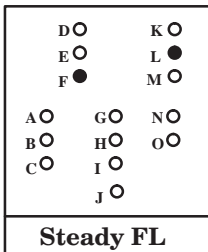
- 
-



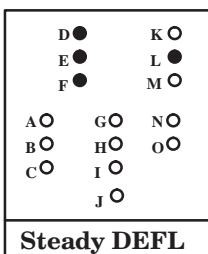
**Ready + Align Media + Load Media + Media:**



**Ready + Data + Media:**

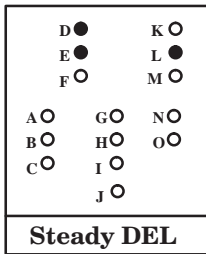


**Load Media + Data:**



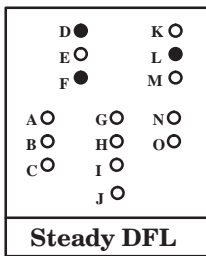
**Ready + Align Media + Load Media + Data:**



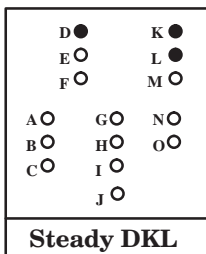


### Ready + Align Media + Data:

- 
- 
- 

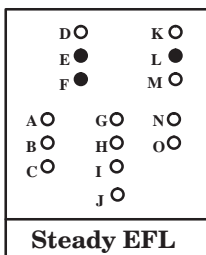


### Ready + Load Media + Data:



### Ready + Cartridges + Data:

- 
- 
- 
- 
- 
- 
- 
- 
- 
- 
- 
- 



### Align Media + Load Media + Data:

-



D○	K●	
E○	L○	
F●	M○	
A○	G○	N○
B○	H○	O○
C○	I○	
	J○	
Steady FK		

## Load Media + Cartridges:

., \$ - / \$ /,  
 --\$ /- -  
 ● ! / . , .  
 ● / .  
 ● / .  
 ● / . ., \$ - /

D○	K○	
E●	L○	
F○	M●	
A○	G○	N○
B○	H○	O○
C○	I○	
	J○	
Steady EM		

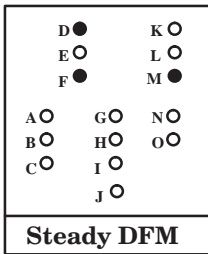
## Align Media + Media: \$- #/. 1

--\$ /- -  
 ● , - 1\$.# .# /.. , --  
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 ● /, .# , \$ ., !! / 0 .# , , \$ " "  
 .# , , \$ " \$- # ! , , - 1# , .# , , \$ "  
 \$ \$ "  
 ● -/, .# .# . 0 \$, . !, .# / .# . /  
 1 , \$ " , , - \$  
 /- .# . - \$  
 ● , ! , .# , , \$ " \$- . - .# - , 0 , . - .  
 . # ! , , - 1\$.# .# , , \$ " . , , ,  
 - , \$ , , \$ - /  
 ● 0 \$, . !, .# - \$ , , # --\$-  
 \$ , , \$ " /-#\$ " -  
 ● .#\$"# . , /, - \$! .# ! \$- . 1 , \$ "  
 , , . .# \$ , , - \$- . ! .# , , , \$ 0 ,  
 \$ , - /- \$ " , - \$ .# 0 . " . 1 .#  
 , , . - -#/. 1 ! .# , ,  
 ● -/, .# .# , - , \$ \$- . \$ 0 , , " ,  
 - .  
 ● , , , .# , , \$ \$ " ➡ "  
 ● .# , , \$ " -- ➡ "

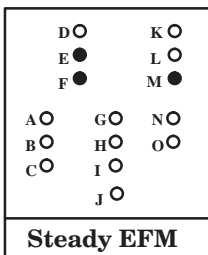
D●	K○	
E●	L○	
F○	M●	
A○	G○	N○
B○	H○	O○
C○	I○	
	J○	
Steady DEM		

## Ready + Align Media + Media: \$- 0 . , , ,

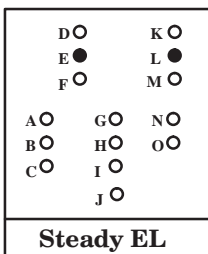
--\$ /- -  
 ● .#\$ " \$- /- \$ " --\$ 0 !, \$ . \$ \$ .# \$-  
 , , \$ " \$-  
 ● # , , \$ " . / # - .# \$ - \$. 0 -



**Ready + Load Media + Media:**



**Align Media + Load Media + Media:**



**Align Media + Data:**

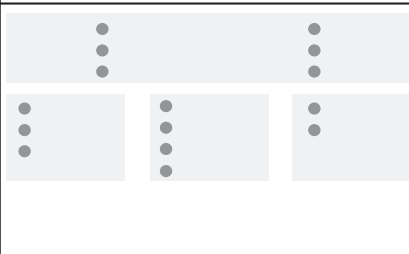


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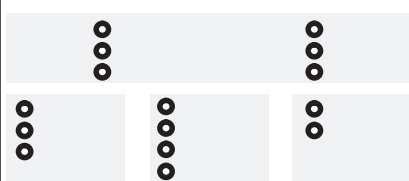
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## User Messages

Key to table  
starting below

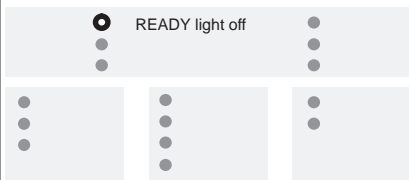
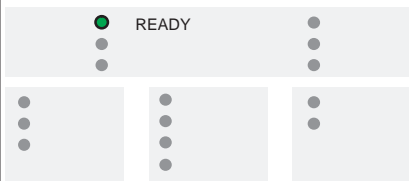
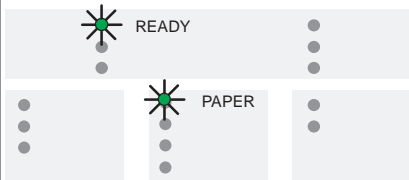
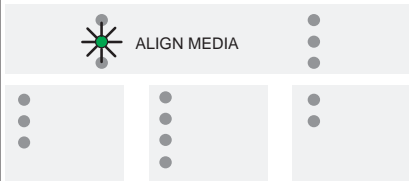
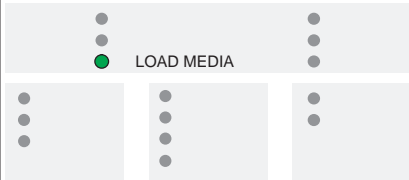
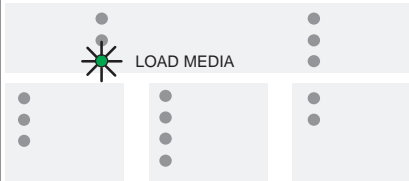
This graphic ...	means ...
	<p>The fifteen lights on the printer's front panel. The sequence of explanations in the table is:</p> <div> <div>1: Status group</div> <div>2: Error group</div> <div>3: Print quality group</div> <div>4: Media type group</div> <div>5: Media source group</div> </div>
●	This light is ON and STEADY.
✱	This light is ON and FLASHING.
○	This light is OFF or this is the relevant light.
•	The state of this light is not relevant.

No lights

Lights	Explanation and Action
<p>All lights off</p> 	<p>If no lights are on, you may have a power problem, or the printer may be switched off.</p>



## Status group

Lights	Explanation and Action
 <p>READY light off</p>	<p>The printer is <i>not</i> ready to print.</p> <p><i>Check the state of the other lights and look them up in this table.</i></p>
 <p>READY</p>	<p>The printer is ready to print.</p> <p><i>Send your print from your computer or, for a special internal print, press the appropriate key combination.</i></p>
 <p>READY</p> <p>PAPER</p>	<p>The printer is busy with a task or is receiving a file. <i>Wait.</i></p> <p>If combined with one of the four media type group lights flashing. The printer is waiting for the media to dry. This can be terminated by pressing <b>Form Feed</b>.</p>
 <p>ALIGN MEDIA</p>	<p>You are loading media and need to realign it, even if it seems perfectly aligned.</p> <p><i>Lower the media lever, realign the media, and raise the media lever.</i></p>
 <p>LOAD MEDIA</p>	<p>The printer is ready, but you need to load media.</p> <p><i>When you are ready to print, load media.</i></p>
 <p>LOAD MEDIA</p>	<p>The printer has a file in memory, which it is waiting to print, but no media is loaded.</p> <p><i>Load media.</i></p>

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Lights	Explanation <i>and Action</i>

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## Self Test and Normal Initialization

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

*If the cover is open, nothing further happens until you close it.*

**10**

**11**

**12**

*Does not eject roll media if loaded.*

**13**

**14**

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## Which Service Test to Perform

Assembly/Feature	Tested by ...
Bail system	Bail cycle test, Bench run, Modular Test
Carriage	Carriage test, Electrical test, Modular test
Carriage motor and drive system (including belt, pulley and slider rod)	Carriage-axis test, Bail cycle test, Modular test, Bench run
Cartridge identification	Carriage test, Modular test
Cartridge nozzles	Carriage test, Modular test
Communication between computer and Printer	Service monitor
Cover sensor	Sensors test, Modular test
DRAM SIMM	Electrical test, Power-on tests, Bench run
EEROM	Electrical test, Power-on tests, Bench run
Electronics module	Electrical test, Power-on tests, Servo/Encoder test, Sensors test, Bail cycle test, Front-panel test, Media-axis test, Carriage test, Carriage-axis test, Bench run, Modular test
Encoder strip	Carriage-axis test, Servo/Encoder test, Modular test, Bench run
Front-panel keys and LEDs	Front-panel test, Modular test
Media-axis encoder and cable	Servo/Encoder test, Media-axis test, Modular test, Bench run
Media motor and drive system (including drive roller and overdrive)	Media-axis test, Modular test, Bench run
Media sensor	Sensors test, Modular test
Pinch-arm sensor	Sensors test, Modular test
Optical sensor (on carriage)	Carriage test, Modular test
ROM	Electrical test, Power-on tests, Bench run
Service station	Bail cycle test
Trailing cable	Electrical test, Power-on tests, Bench run



- 1                      ➤
- 2                      ➤
- 3                              ➤
- 4                      ➤
- 5                      ➤
- 6                              ➤
- 7                      ➤
- 8                      ➤
- 
- 
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**9** ➡

**10** ➡

**11** ➡

**12** ➡

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**13** ➡

**14** ➡

**15** ➡

**16** ➡

---

**do not**

**THE COVER SENSOR IS DISABLED WHEN IN SERVICE MODE 1. IF THE CARRIAGE IS MOVING IT WILL NOT STOP IF THE COVER IS OPENED. BE VERY CAREFUL NOT TO PUT YOUR HANDS INSIDE.**

**1**

*The Electronics Test is continuously done in the background during Service Mode 1. If you are viewing information via the serial port, you will see output similar to the following:*

```
Test Mode EE test: 0
Test Mode EE test: 1
```

## **Stopping a Test**

### **Cancel and Media Source**

## **Entering Service Mode 1**

**1 Reprint**

**2**



---

## Viewing Test Output via the Serial Port

1

### Using Windows 3.1

1

2

3

**Terminal**

**Accessories Group**

4

**Terminal**

**Settings**

**Communications**

5

- 
- 
- 
- 
- 
- 

6

**OK**

7

### Using an HP Palmtop PC

1

*Both cable and adaptor are included in the HP F1021B Connectivity Pack.*

2

**1**

3

4

**Data Comm**

**MENU**

5

**Connect**

**ENTER**

6

**Settings**

7

**Connect**

**ENTER.**

8

**Connect**

**Connect**

**ENTER.**

9

**Hangup**

**Connect**

---

## Bail Cycle Test

**This Test has been designed to be used during the manufacturing stage and not in the field. If the Bail needs to be tested, please use the Bail Test in Service Mode 2. If a system error prevents you from entering into Service Mode 2, you may try this test instead.**

1                      1,        Bail Cycle Test

2

3

Cancel and Media Source

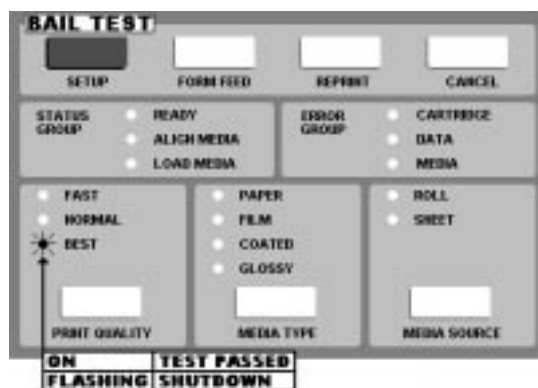
4

LED C

5

LED C

6



*If the bail fails the test, try replacing the following component:*

**1** *Bail-lift mechanism* ➤ *page 8-28.*

---

## Front Panel Test

### 1 Front Panel Test

*If you are viewing information via the serial port, you will see output similar to the following:*

```
1. - Front Panel Test
```

*This message only informs you that the test has started, and a message will **not** appear if the test passes or fails.*

2

3

LED I

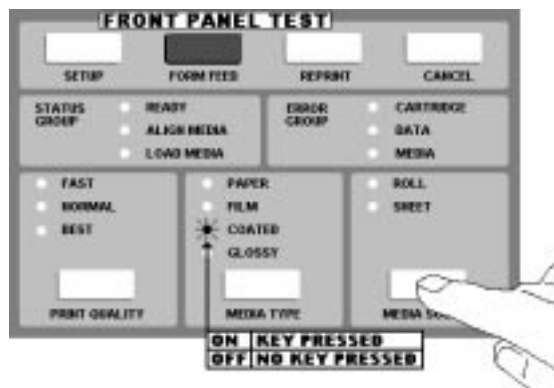
4

LED I

5

Cancel and

Media Source



*If the test fails, to resolve the problem, try one of the following:*

- 1 Check that the cable for the Front Panel Assembly is connected to the Electronics Module. Also make sure that the cable is **NOT** damaged or twisted.
- 2 Replace the Front Panel Assembly ➤ page 8-12.
- 3 Replace the Electronics Module ➤ page 8-13.

### Carriage Axis (Y-axis) Test

***This Service Mode does not include carriage-axis initialization. If the carriage starts somewhere out of the Service Station, it will hit the right-hand side of the Printer when the test begins, and the test will fail. Always make sure that the carriage is parked in the service station before starting this test.***

**1**

## 2 1 Carriage-Axis Test

3

## 4 LED A

*If you are viewing information via the serial port, you will see output similar to the following:*

```

2. - Y-AXIS TEST
Test Mode Y-axis cycle: 26.67 speed and 66 pwm
Test Mode Y-axis cycle 50.00 speed and 100 pwm
Test Mode Y-axis cycle: 26.67 speed and 68 pwm

```

5 LED A

*If you are viewing information via the serial port, you will see output similar to the following:*

```
2. - Y-AXIS TEST
Test Mode Y-axis cycle: 26.67 speed and 0 pwm
Test Mode Error: 2 on y-axis test
```

**6 Media Source** **Cancel and**

*The test is continued on the next page.*

**Y-AXIS TEST**

SETUP	FORM FEED	REPRINT	CANCEL
STATUS GROUP	<input type="radio"/> READY <input type="radio"/> ALIGN MEDIA <input type="radio"/> LOAD MEDIA	ERROR GROUP	<input type="radio"/> CARTRIDGE <input type="radio"/> DATA <input type="radio"/> MEDIA
<input checked="" type="radio"/> FAST <input type="radio"/> NORMAL <input type="radio"/> BEST	<input type="radio"/> PAPER <input type="radio"/> FILM <input type="radio"/> COATED <input type="radio"/> GLOSSY	<input type="radio"/> ROLL <input type="radio"/> SHEET	
PRINT QUALITY	MEDIA TYPE	MEDIA SOURCE	

ON TEST PASSED  
FLASHING SHUTDOWN

*If the test fails, to resolve the problem, try one of the following:*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8



***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

---

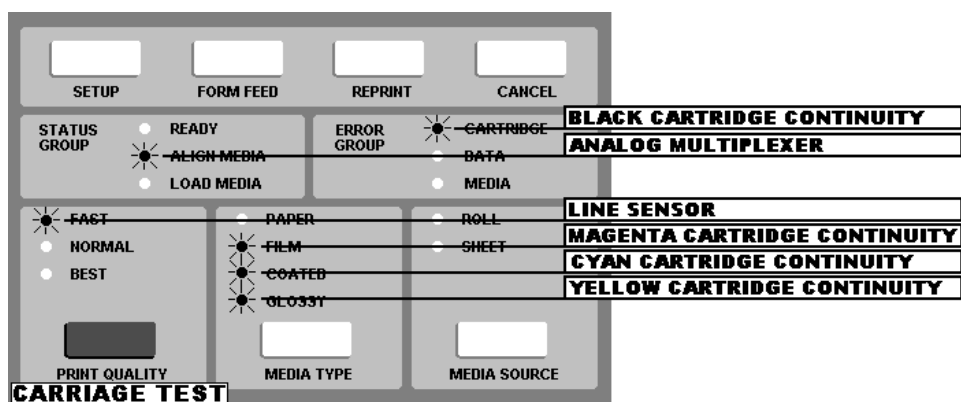
## Carriage Test

### 1 Carriage Test

2

3

fails passes ON



*If you are viewing information via the serial port, you will see output similar to the following if the **Test Passes**:*

```
4. - Carriage Test
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Calvin: 13643 1960
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Yellow: 11361 1953
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Cyan: 11361 1953
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Magenta: 11361 1953
Pen BLACK continuity: WORKS
Pen CYAN continuity: WORKS
Pen MAGENTA continuity: WORKS
Pen YELLOW continuity: WORKS
Pen BLACK has lcd4 identification.
Pen CYAN has 400 identification.
Pen MAGENTA has 1f00 identification.
Pen YELLOW has 1900 identification.
Optical sensor samples: 253 255 255 254 253 252 252 250 249 248 247
246 245 244 243 241
Optical Sensor: WORKS
Carriage MUX : WORKS
Pen BLACK continuity: WORKS .....
```

***The test is continued on the next page.***

*If you are viewing information via the serial port, you will see output similar to the following if the **Test Fails**:*

```
4. - Carriage Test
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Calvin: 13643 1960
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Yellow: 12160 1899
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Cyan: 12160 1899
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Magenta: 12160 1899 Pen BLACK
continuity: FAILS
Pen CYAN continuity: FAILS
Pen MAGENTA continuity: FAILS
Pen YELLOW continuity: FAILS
Pen BLACK has 3ffe identification.
Pen CYAN has 3ffe identification.
Pen MAGENTA has 3ffe identification.
Pen YELLOW has 3ffe identification.
Optical sensor samples: 215 252 243 232 221 208 194 179 166 151 135
119 103 87 71 54
Optical Sensor: WORKS
Carriage MUX : FAILS
Pen BLACK continuity: FAILS .....
```

## 4 Media Source

**Cancel and**

### Cartridge Continuity Test Failure

*If any cartridge Continuity test fails, to resolve the problem, try one of the following:*

- 1 Remove the failing Cartridge and clean the flex contacts on the Carriage and the Cartridge. Reseat the Cartridge and try the test again.*
- 2 Replace the Cartridge of the relevant failing color and perform this test again.*
- 3 Check and if necessary replace the Trailing Cable ▶ page 8-8.*
- 4 Replace the Carriage Assembly ▶ page 8-37.*
- 5 Replace the Electronics Module ▶ page 8-13.*

***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

***The test is continued on the next page.***

## Line Sensor Test Failure

*If the Line Sensor test fails, to resolve the problem, try one of the following:*

- 1 Line sensor incorrectly calibrated:** *The accuracy calibration includes calibration of the line sensor on the carriage. You must use HP Matte film when performing the accuracy calibration (Details ▶ Chapter 5). Otherwise the line sensor will have problems loading some types of media.*
- 2** *Check and if necessary replace the Trailing Cable ▶ page 8-8.*
- 3** *Replace the Carriage Assembly ▶ page 8-37.*
- 4** *Replace the Electronics Module ▶ page 8-13.*

***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

## Analog Multiplexer Test Failure

*If the Analog Multiplexer test fails, to resolve the problem, try one of the following:*

- 1** *Check and if necessary replace the Trailing Cable ▶ page 8-8.*
- 2** *Replace the Carriage Assembly ▶ page 8-37.*
- 3** *Replace the Electronics Module ▶ page 8-13.*

***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***



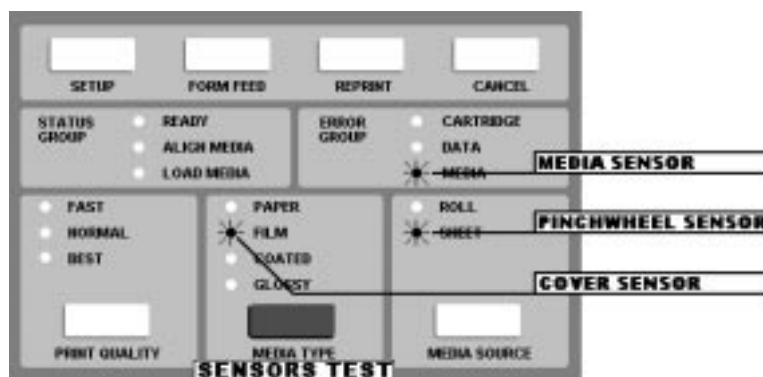
---

## Sensors Test

### 1 Sensors Test

2

### 3 Media Source Cancel and



*If you are viewing information via the serial port, you will see output similar to the following:*

5. - SENSORS TEST

*This message only informs you that the test has started, and a message will **not** appear if the test passes or fails.*

*If the test fails, to resolve the problem, try one of the following:*

- 1** *If the cover sensor fails, check that the front-panel assembly is correctly connected to the electronics module. Try replacing the front-panel assembly.*
- 2** *If the Pincharm sensor fails, check that the sensor cable is correctly connected to the electronics module. Try replacing the pincharm sensor.*
- 3** *If the Media sensor fails, check that the sensor cable is correctly connected to the electronics module. Try replacing the overdrive assembly (the media sensor is included as part of the overdrive assembly).*
- 4** *Replace the Electronics Module* ▶ *page 8-13.*

***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

---

## Media-Axis (X-Axis) Test

### 1 Media-Axis Test

2

### 3 LED J

*If you are viewing information via the serial port, you will see output similar to the following:*

```
3. - X-AXIS TEST  
Test Mode X-Axis Cycle: 92 pwm  
Test Mode X-Axis Cycle: 65 pwm  
Test Mode X-Axis Cycle: 66 pwm
```

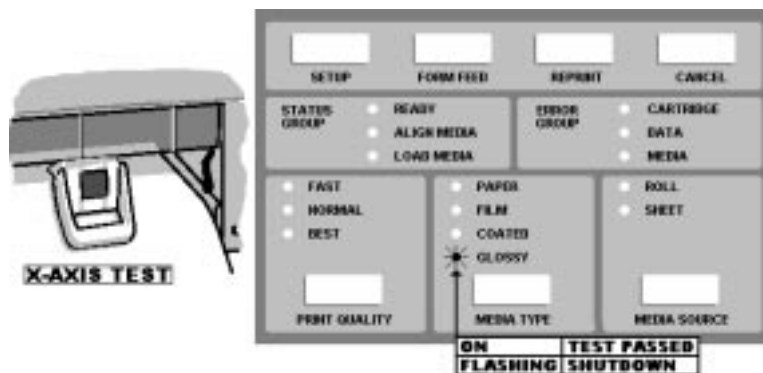
### 4 LED J

*If you are viewing information via the serial port, you will see output similar to the following:*

```
3. - X-AXIS TEST  
Test Mode X-Axis Cycle: 79 pwm  
Test Mode X-Axis Cycle: 115 pwm  
Test Mode X-Axis Cycle: 127 pwm  
Test Mode Error: 1 on X-axis test
```

### 5 Cancel and Media Source

***The test is continued on the next page.***



*If the test fails, to resolve the problem, try one of the following:*

- 1 Switch OFF the Printer and manually moving the carriage along the slider rod, check for obstacle or friction in the X-axis.*
- 2 Check for a faulty or badly connected X-axis Encoder Cable.*
- 3 Replace media motor ▶ page 8-23.*
- 4 Replace electronics module ▶ page 8-13.*

***Only replace one component at a time and perform the test again before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

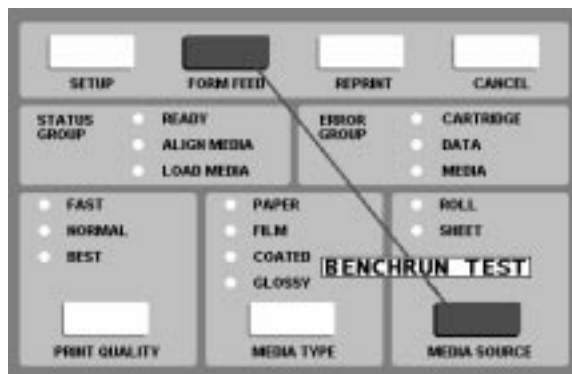
---

## Bench Run

*If the Printer is switched OFF during the Bench Run, the Bench Run will be resumed at exactly the same point before the Printer was switched OFF, until the Bench Run is completed.*

**THIS TEST HAS BEEN DESIGNED TO BE USED DURING THE MANUFACTURING STAGE AND NOT IN THE FIELD.  
DO NOT AT ANYTIME ENTER THIS TEST WHEN TROUBLESHOOTING THE PRINTER.**

- 1                      Bench Run                      Media Source                      Form  
Feed                      1                      you  
must immediately EXIT the Bench Run by switching OFF the  
Printer and powering ON again while pressing the Print Quality  
and Media Source keys



---

## Modular Test

- 
- 
- 
- 
- 

*This Service Mode does not include carriage-axis initialization. If the carriage starts somewhere out of the Service Station, it will hit the right-hand side of the Printer when the test begins, and the test will fail. Always make sure that the carriage is parked in the service station before starting this test.*

1

2

1

Modular Test

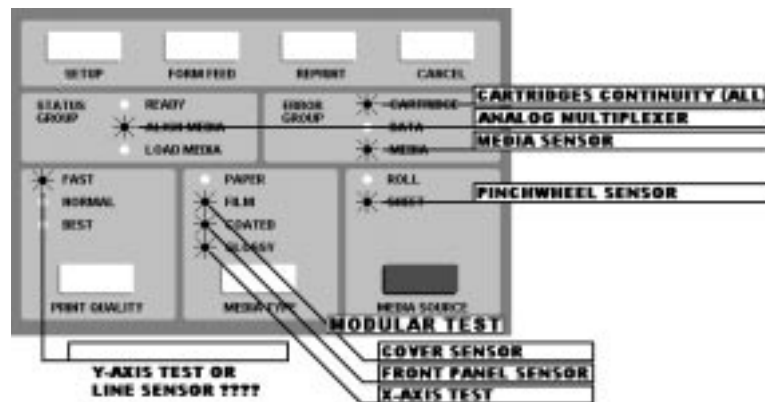
3

4

fails

passes

ON



*The test is continued on the next page.*

## Media Source

*If you are viewing information via the serial port, you will see output similar to the following if the **Test Passes**:*

```

1. - FRONT PANEL TEST
2. - Y AXIS TEST
3. - X AXIS TEST
4. - CARRIAGE TEST
5. - SENSORS TEST
Test Mode X-axis cycle : 87 pwm.
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Calvin: 13643 1960
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Yellow: 11361 1953
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Cyan: 11361 1953
0x57c7c350 (carrPCBTest): Forcing use of R10X method for Magenta: 11361 1953
Test Mode Y-axis cycle : 26.67 speed and 68 pwm.
Test Mode X-axis cycle : 67 pwm.
Test Mode Y-axis cycle : 50.00 speed and 100 pwm.
Test Mode X-axis cycle : 66 pwm.
Test Mode Y-axis cycle : 26.67 speed and 66 pwm.
Test Mode X-axis cycle : 65 pwm.
Test Mode Y-axis cycle : 50.00 speed and 98 pwm.
Pen BLACK continuity: WORKS
Pen CYAN continuity: WORKS
Test Mode X-axis cycle : 64 pwm.
Pen MAGENTA continuity: WORKS
Pen YELLOW continuity: WORKS
Pen BLACK has lcd4 identification.
Pen CYAN has 400 identification.
Pen MAGENTA has 1f00 identification.
Pen YELLOW has 1900 identification.
Optical sensor samples: 255 255 255 255 255 254 254 253 253 252 252 251
251 250 250 249
Optical Sensor: WORKS
Encoder sensor: WORKS
Pen BLACK continuity: WORKS
Test Mode Y-axis cycle : 26.67 speed and 68 pwm
.....

```

*The result of the Encoder sensor test is only reported via the serial output and not via the front-panel. In order to perform the encoder sensor test, you must move the carriage **slightly** so that the encoder sensor can detect the change in status. If the carriage is not moved at all, the Encoder Sensor test will always fail. If the carriage is moved and **ONLY** the Encoder Sensor test fails, then you need to replace the Carriage Assembly ► page 8-37.*

*If any of the tests fail, refer to the individual test documented in this chapter for the correct troubleshooting procedure.*

---

## Electronics Test

**THIS TEST HAS BEEN FOUND TO BE VERY UNSTABLE DUE TO SOME INTERACTIONS BETWEEN SOME OF THE COMPONENTS OF THE ELECTRONICS MODULE. IT IS SOMETIMES IMPOSSIBLE TO EXIT THIS TEST WITHOUT SWITCHING OFF THE PRINTER.**

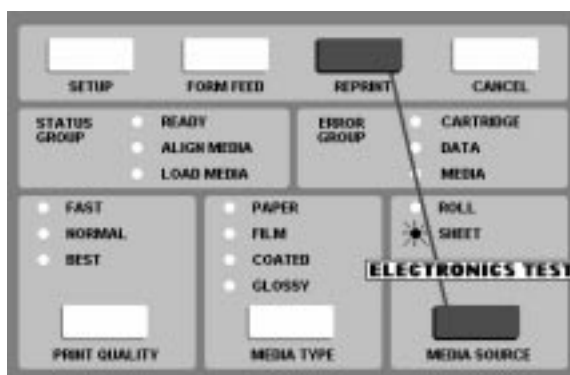
1                      1                      **Electronics Test**

2

3    **LED O**

4    **LED O**

5                      **Media Source**    **Cancel and**



*If the bail fails the test, try replacing the following component:*

**1 Electronics Module** ➡ *page 8-13.*



do

NOT

2



## Stopping a Test

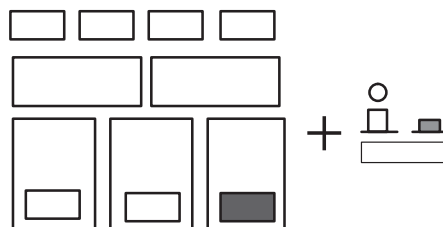
## Entering Service Mode 2

1 Media Source

2 Media Source

*The printer performs the electrical power-on tests and initializes the mechanics as in normal user mode.*

*When you are in Service Mode 2, All the LEDs will go off except the ones that have been selected. Once inside a test, all the LEDs, except for the LEDs in the Error Group, will begin to flash.*



## SERVICE MODE 2



---

## Bail Test

1                      2                      **Bail Test**

2

3

4

The screenshot shows the 'BAIL TEST' menu on a printer's control panel. At the top, there are four buttons: 'SETUP', 'FORM FEED', 'REPRINT', and 'CANCEL'. Below these are three main sections. The first section, 'STATUS GROUP', contains three options: 'READY', 'ALIGN MEDIA', and 'LOAD MEDIA'. The second section, 'ERROR GROUP', contains three options: 'CARTRIDGE', 'DATA', and 'MEDIA'. The third section contains three sub-sections: 'PRINT QUALITY' with options 'FAST', 'NORMAL', and 'BEST'; 'MEDIA TYPE' with options 'PAPER', 'FILM', 'COATED', and 'GLOSSY'; and 'MEDIA SOURCE' with options 'ROLL' and 'SHEET'. Each of these three sub-sections has a corresponding empty box below its list of options.

*If the bail fails the test, try replacing the following component:*

**1** *Bail-lift mechanism* ➤ page 8-28.

---

## Electrical Test

**THIS TEST HAS BEEN FOUND TO BE VERY UNSTABLE DUE TO SOME INTERACTIONS BETWEEN SOME OF THE COMPONENTS OF THE ELECTRONICS MODULE. IT IS SOMETIMES IMPOSSIBLE TO EXIT THIS TEST WITHOUT SWITCHING OFF THE PRINTER.**

- 1
- 2      **Electrical Test**
- 2
- 3

The screenshot shows a printer's control panel menu titled "ELECTRICAL TEST". At the top, there are four buttons: "SETUP", "FORM FEED", "REPRINT", and "CANCEL". Below these are two columns of status and error groups. The left column, labeled "STATUS GROUP", includes "READY", "ALIGN MEDIA", and "LOAD MEDIA". The right column, labeled "ERROR GROUP", includes "CARTRIDGE", "DATA", and "MEDIA". Below these are three sections for media settings: "PRINT QUALITY" with options "FAST", "NORMAL", and "BEST"; "MEDIA TYPE" with options "PAPER", "FILM", "COATED", and "GLOSSY"; and "MEDIA SOURCE" with options "ROLL" and "SHEET". Each of these three sections has a corresponding empty box at the bottom for selection.

---

## Servo/Encoder Test

- 
- 
- 

### 1                      2                      Servo/Encoder Test

2

3

4



### Service Monitor (Data Display)

**1**

2

## 2 Service Monitor

3

*The **Ready** LED begins to flash.*

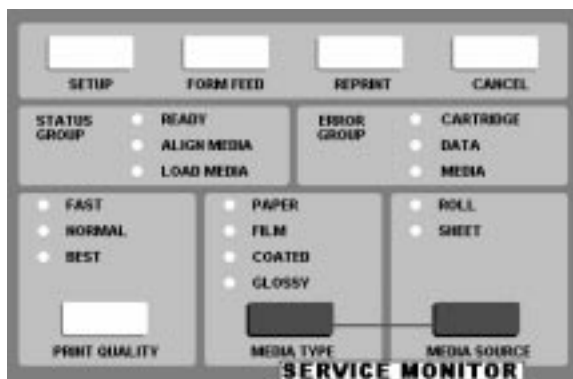
4 computer

*The **Ready** LED continues to flash.*

## 5 Ready Service Monitor

The **Ready** LED continues to flash. After a minute, the fan turns on, and the carriage moves to the right side of the Printer.

*Instead of printing the drawing that you sent, the Printer prints the first and last Kbytes of the code for that drawing. The code is printed in hexadecimal and ASCII format. (If the total size of the file(s) sent is not bigger than one Kbyte, only the first buffer is printed.) The Printer exits the service monitor mode if the file(s) sent contain PjL universal exit language.*



---

## EEROM Model ID Configuration Procedure

- 
- 
- 

**Steady EKL**

*It is very rare that these situations will ever occur.*

**1**



**2**

**3**

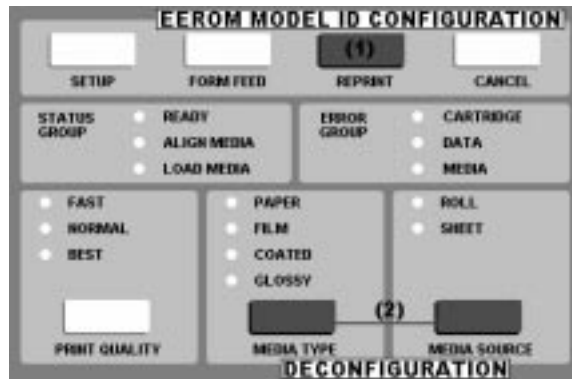
**Reprint**

**4**

**Media Source  
deconfiguration mode**

**Media Type**

**LEDs ABC**



**5**

**LEDs KLM**

**6**

**LEDs ABC**

**7**

**Cancel      Media Source  
deconfiguration mode**

*The instructions are continued on the next page.*

8

*Only one opportunity is given to perform this procedure and there is no indication that it was successful.*

**Media Source  
(Print Quality + Media Type)**

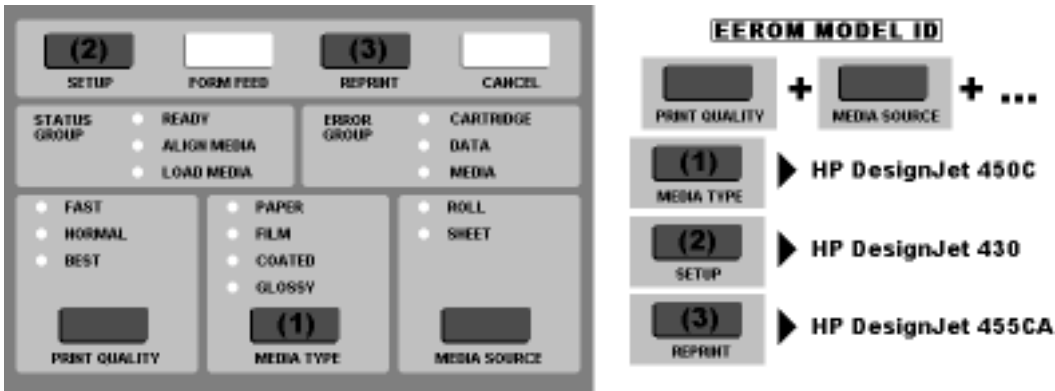
**Color Configuration**

**Media Source  
Configuration (Print Quality + Setup)**

**Mono**

**Media Source  
(Print Quality + Reprint)**

**LFP Configuration**



9

10

11

12 **Cancel**

*If the Printer is still incorrectly configured then Error Code “EKL” will be displayed on the front panel. Turn the Printer OFF and perform the EEROM Model ID configuration procedure again from step 2.*

13

---

# Service Configuration Plot

DesignJet 4XX Service Configuration Plot  
Firmware Release: X.XX.XX  
SPROC release: X.X (*Servo-Processor Code revision number.*)

EEROM Contents

EEROM CONTENTS  
(This is for the Printer design engineers to interpret.)

NOTE: All EEPROM Parameters are since last EEROM Reset.

Number of Power Cycles:	19
Number of Color Plots:	13
Number of Black Plots:	15
Number of Pens:	7 6 6 6
Factory Spittoon:	0% used
Number of Bail Errors:	0
Number of System Errors:	2
Last System Error:	0x00000550 (errno = 0x3c0001)
Last System Error at file media_load.c line 2810	
Bench Run:	
Bench Run Maximum Y-Axis (Carriage-Axis) PWM:	127
Bench Run Maximum X-Axis (Media-Axis) PWM:	87
Encoder-Tests Maximum Y-Axis (Carriage-Axis) PWM:	62
Encoder-Tests Maximum X-Axis (Media-Axis) PWM:	62
X-axis Calibration: Amp1 = 7.467, Phase1 = -0.450, Amp2 = 8.956, Phase2 = 2.325, Factor = -0.000500	

---

## Printing the Service Configuration Plot

1

2

*In normal mode, load a sheet in portrait orientation.*

*The service configuration plot can be plotted without the need to enter the service mode. This is because the customer will be requested to plot the service configuration plot and he will be given the following instructions to plot it without entering the service mode.*

2

Type

Ready

Print Quality and Media

3

Ready

4

The image shows a grayscale representation of a printer's service configuration plot. At the top, there are four rectangular buttons labeled 'SETUP', 'FORM FEED', 'REPRINT', and 'CANCEL'. Below these are two columns of status indicators. The left column, labeled 'STATUS GROUP', includes 'READY', 'ALIGN MEDIA', and 'LOAD MEDIA'. The right column, labeled 'ERROR GROUP', includes 'CARTRIDGE', 'DATA', and 'MEDIA'. In the center, there are two columns of print quality and media type options. The left column, labeled 'PRINT QUALITY', includes 'FAST', 'NORMAL', and 'BEST'. The right column, labeled 'MEDIA TYPE', includes 'PAPER', 'FILM', 'COATED', and 'GLOSSY'. To the right of these, there is a column for 'MEDIA SOURCE' with options 'ROLL' and 'SHEET'. At the bottom, there are three rectangular buttons labeled 'PRINT QUALITY', 'MEDIA TYPE', and 'MEDIA SOURCE'. The entire screen is titled 'SERVICE CONFIGURATION PLOT' at the bottom.

## Interpreting the Service Configuration Plot

### Number of Power Cycles

### Number of Color Plots

### Number of Black Plots



### Number of Pens

# ( ' )! \$' # \$ " # ( \* & # ( ' ! )  
! )' & ! ) \$"# 2 ( " ( &&) & %

### Factory Spittoon

# \$' & &)! \$(%\$( # \*\$ ))( # \$ & & \$&& \$( ) \$! #  
# ( &

### Number of Bail Errors

) ' (2 # ) ( # # ( )! # \$&3&\$! ' # (\$ '

### Number of System Errors

) ' (2 2 ' ) # )

### Last System Error

# & 2 ' ) # )

*This information might be requested in the event of an escalation in order to understand any problems.*

### Last System Error Data

(!) ' \$( )( &2 # \$ # &\$( )! # !\$ ' # ) ) \$(

*This information might be requested in the event of an escalation in order to understand any problems.*

### Bench Run

# # # ( # ( # ( \* ! ) '

### Bench Run Maximum Y-Axis (Carriage-Axis) PWM

# \$ & #) & **less** # ( 2\*\$ & & 3

### Bench Run Maximum X-Axis (Media-Axis) PWM

# \$ & #) & **less** # ( 2\*\$ & & 3

### Encoder -Tests Maximum Y-Axis (Carriage-Axis) PWM

# \$ & #) & **less** # ( 2\*\$ & & 3

### Encoder -Tests Maximum X-Axis (Media-Axis) PWM

# \$ & #) & **less** # ( 2\*\$ & & 3

### X-axis Calibration

# \$ #) # \$(!) ' \$( & ) # 2 & \$ \$(

*This information might be requested in the event of an escalation in order to understand any problems.*

---

## Clearing the EEROM

---

### CAUTION



---

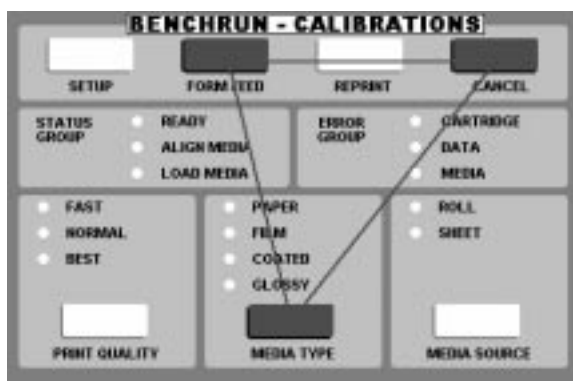
## Clearing Just the Benchrun and Calibration Parameters

1

2

Form Feed, Cancel      Media Type

3



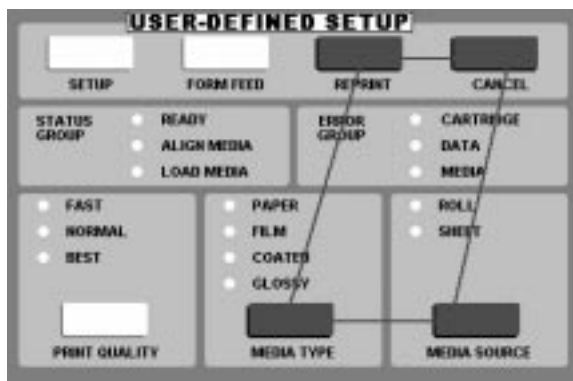
## Clearing Just the User-Defined Setup Parameters

1

2

Reprint, Cancel, Media Type      Media Source

3



## Clearing All Parameters

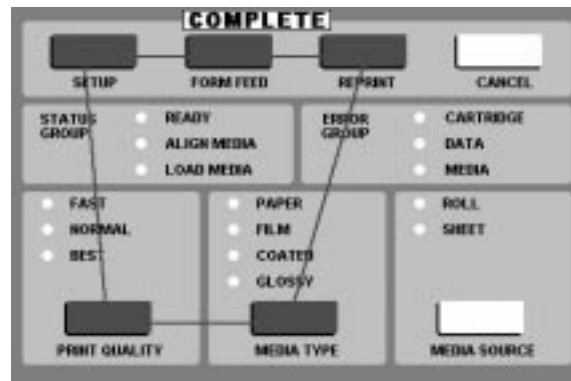
1

2

Media Type

Setup, Form Feed, Reprint, Print Quality

3





---

---

---

## Accuracy Calibration

### Accuracy Calibration

#### Purpose

- 
- 
- 
- 
- 
- 
- 
- 

#### What is the End-Point Accuracy Specification ?



$$\frac{\text{Measured length} - \text{Desired length}}{\text{Desired length}} \times 100 = \% \text{Error}$$

#### What can Affect the End-Point Accuracy ?

- 
- 
- 
-

## Before Performing the Accuracy Calibration

1 Measure the distance between the center of the printer's carriage and the center of the printer's paper support. The distance should be 500 mm (19.69 in.) ± 1 mm (0.04 in.).

2 If the measured accuracy, media thickness, or environmental conditions vary greatly from the factory standards, recalibrate the Printer by continuing with the following procedure.

*Accuracy calibration is needed if this distance is not 500 mm (19.69 in.) ± 1 mm (0.04 in.).*

*If the measured accuracy, media thickness, or environmental conditions vary greatly from the factory standards, recalibrate the Printer by continuing with the following procedure.*

## Performing the Accuracy Calibration

1 Load a sheet of HP Matte Film into the printer. The sheet should be approximately A1 or D size.

*Use a sheet of approximate size A1 or D.*

***You must use HP Matte Film.*** Otherwise the optical sensor on the carriage will be calibrated incorrectly, and the Printer will have problems loading some types of media.

2 Press the **Service Mode** button (2) and the **Media Source** button (1).

3 Press the **Media Type** button (3) and the **Coated Paper** button (4).

4 Press the **Ready** button (5) and the **Reprint** button (2).

5 The **Ready** LED begins to flash and the Printer takes several minutes to plot the calibration plot (see Figure 1). The Printer ejects the sheet, and the **Load Media** LED lights up.

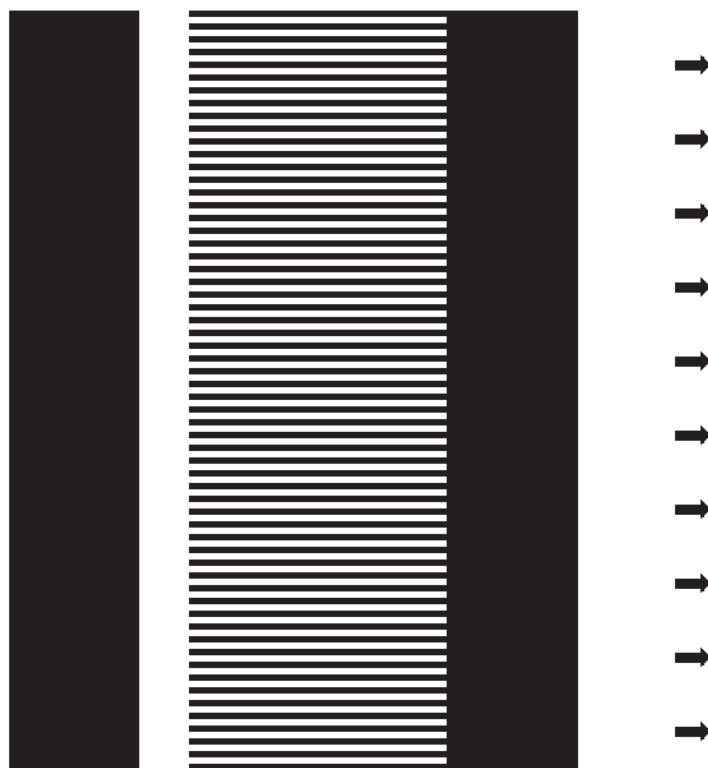
6 The **Ready** LED begins to flash. The Printer takes less than 10 minutes to: read the calibration sheet; calculate the calibration data; save the data in the EEROM; and eject the sheet.

7 The **Ready** LED begins to flash.

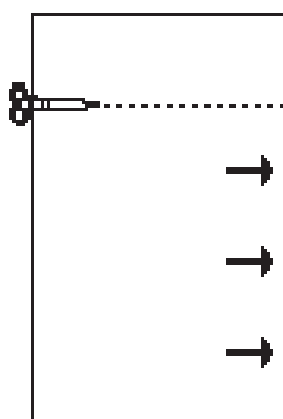
8 The **Ready** LED begins to flash.

9 The **Ready** LED begins to flash.

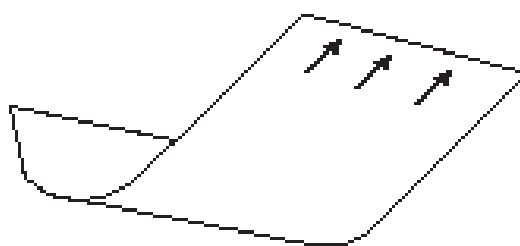
*The **Ready** LED begins to flash. The Printer takes less than 10 minutes to: read the calibration sheet; calculate the calibration data; save the data in the EEROM; and eject the sheet.*



**Figure 1**



**1**



**2**

**Figure 2**



---

**too small**

**too big**

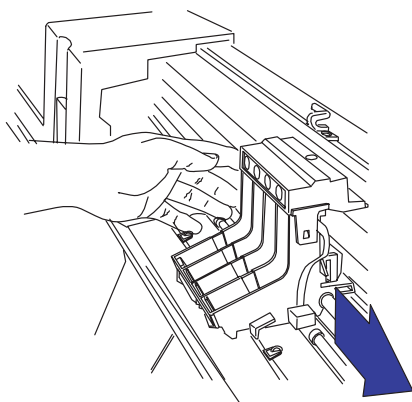


### **To check the carriage-to-media distance**

*Gauge*

**1**

**2**



**3**

**Yellow**

**4**

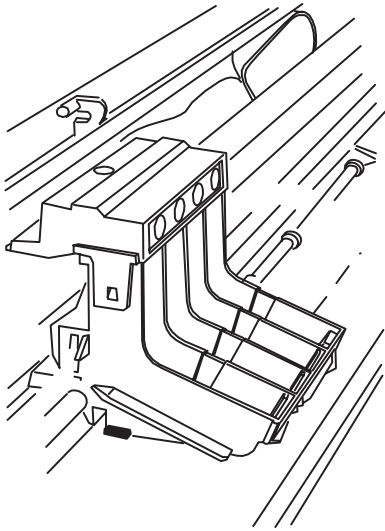
*GO*

*NO GO*



**5**

*GO*



---

### **W A R N I N G**

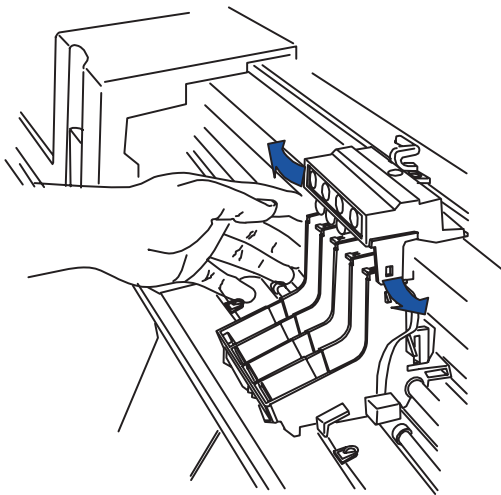
**Make sure that the carriage is in the down position at all times when passing over the gauge.**

---

## To adjust the carriage-to-media distance

- **did not** *GO*
- **did** *NO GO*

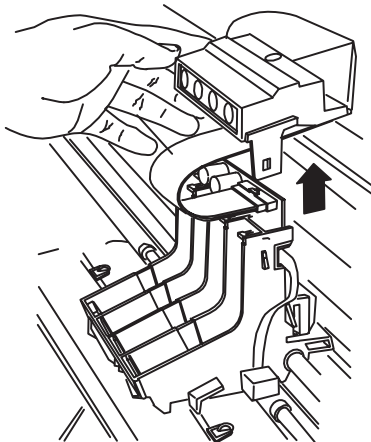
1



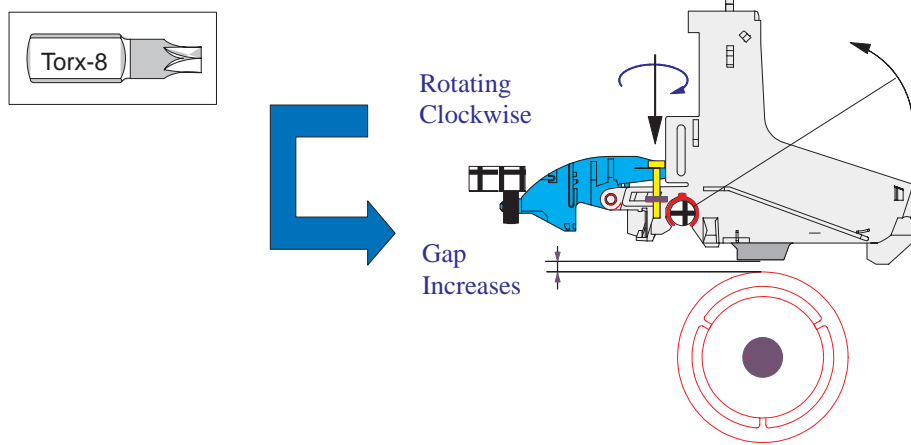
**Take care neither to cut yourself on the encoder strip, nor to damage the strip.**

---

2



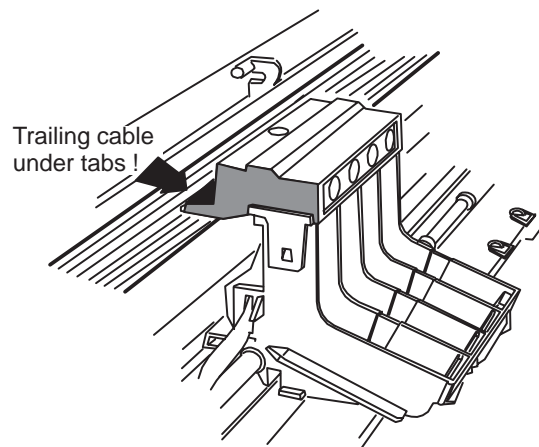
3



4

5

6



---

---

---

**1**

•

**2**

•

•

**3**

•

**4**

•

•



•



**5**

•

•

**6**

•

•



•

**7**



•

---

# Introduction

*To achieve the best performance from the printer, advise the customer to only use genuine HP accessories and supplies, whose reliability and performance have been thoroughly tested to give trouble-free performance and best-quality prints.*

## Using the Print-Quality Plot

- 1
- 2
- 3
- 4

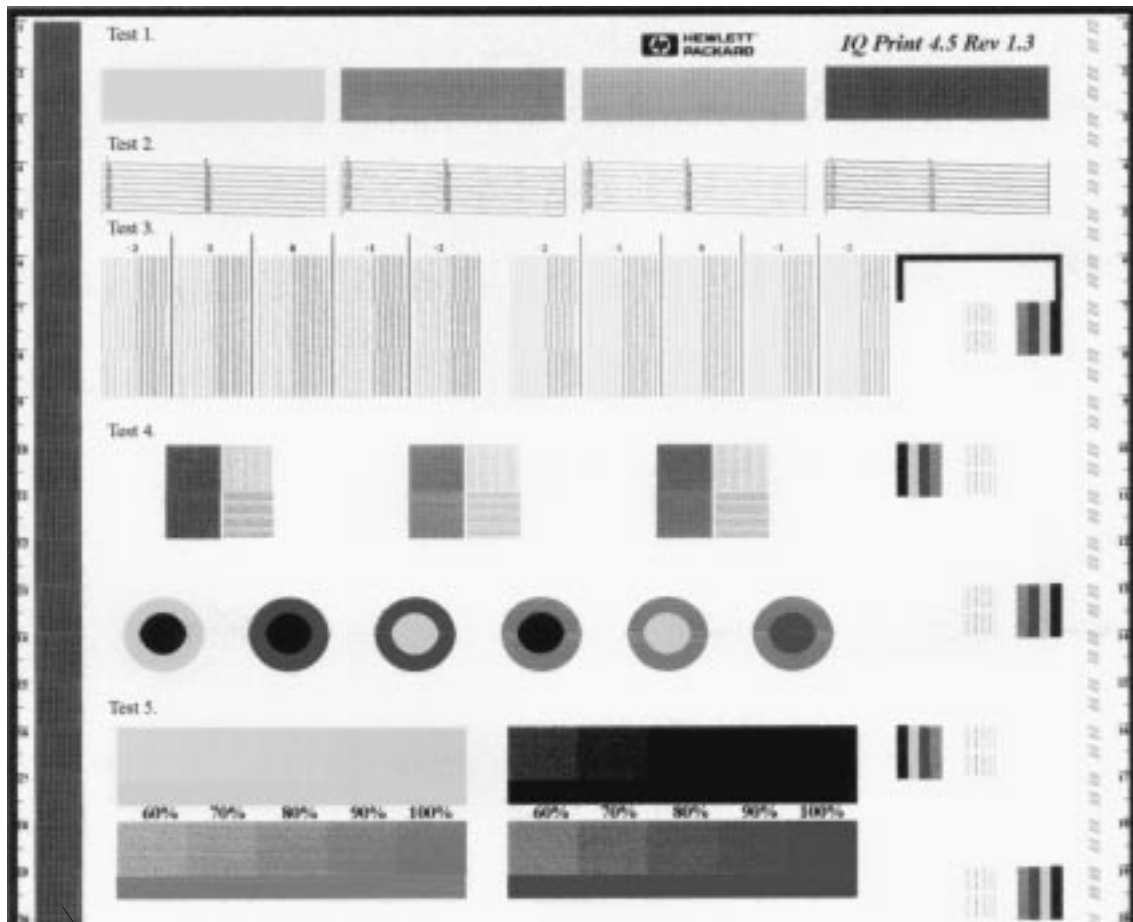
## Printing the Print-Quality Plot

- |   |         |            |       |
|---|---------|------------|-------|
| 1 |         | Media Type | Print |
| 2 | Quality |            |       |
| 3 | Ready   | Form Feed  | Media |
| 4 | Source  |            |       |

*The **Ready** light begins to flash, and the media moves slightly forward. The carriage moves to the right side of the Printer, and the fan turns on. The Printer plots the print-quality plot and ejects the media.*

- 4

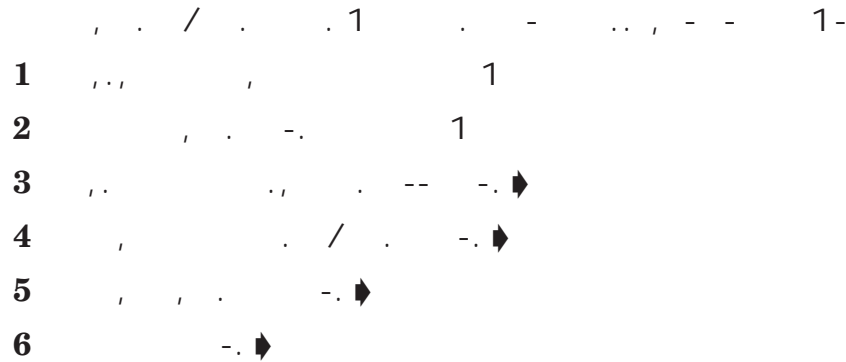
## Print-Quality Plot



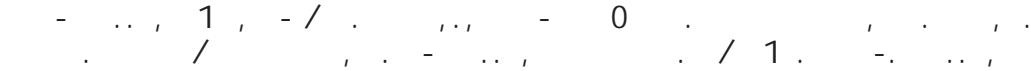
Test 6



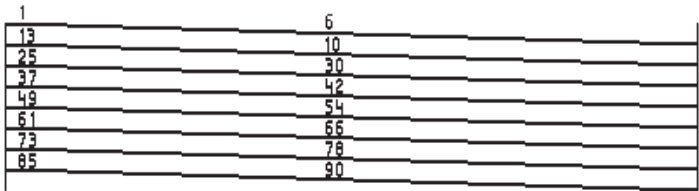
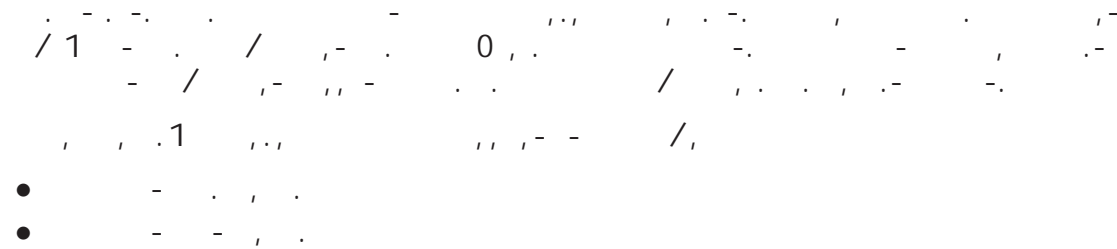
**Analyzing the Print-Quality Plot**



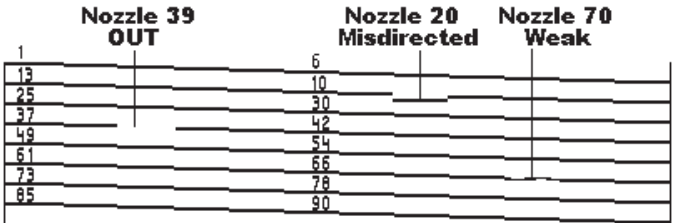
**Test Pattern 1: Cartridge Warm-up**



**Test Pattern 2: Nozzle Print Test**



**CORRECT**



**INCORRECT**

**Figure 1**

## Nozzles not printing (Nozzles Out)

1

## Nozzles misdirected

1

---

### Nozzles Problem 1:

### Nozzles Problem 2:

### Corrective Action:

1

2

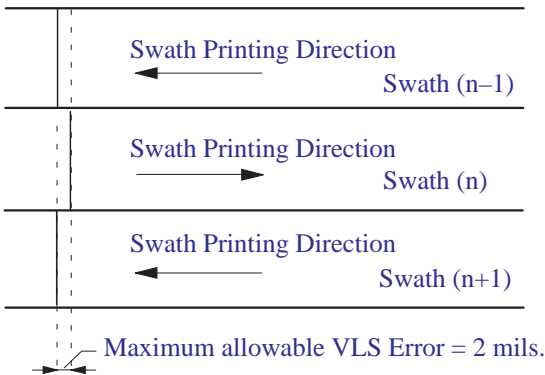
3

•  
•  
•



*Only replace one component at a time and check if the problem has gone before replacing another component. Using this procedure you will be able to determine exactly which component failed.*

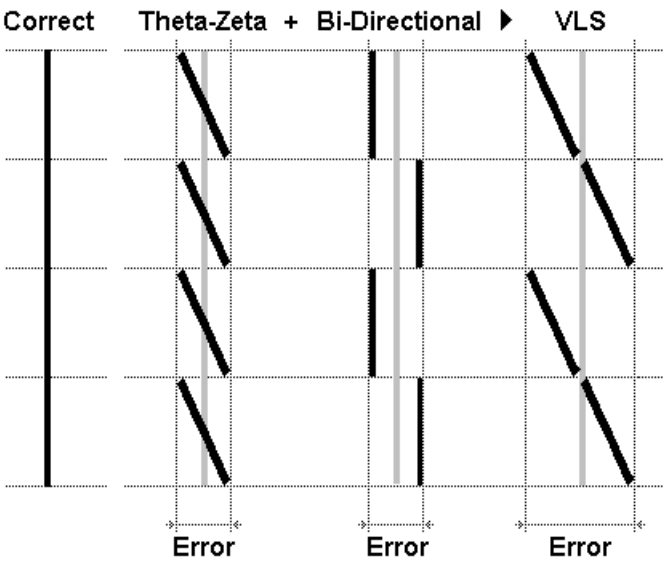
**Test Pattern 3: Vertical Line Straightness Test**



**Figure 2**

**Customer Expectations**

- 
- 



**Figure 3**

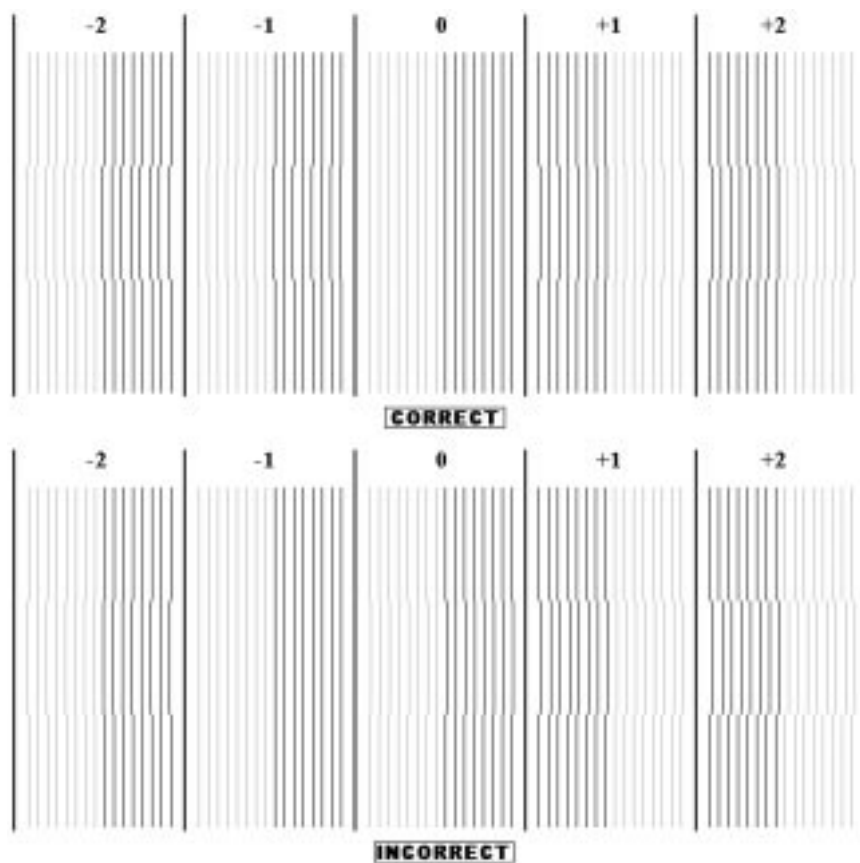
## Bidirectional Error

- 
- 
- 
- 



## Theta-Zeta Error

- 
- 
- 



**Figure 4**

---

**VLS Problem:**

**Bias 0**

**Corrective Action:**

**1**



**2**



**3**

**4**



*Only replace one component at a time and check if the problem has gone before replacing another component. Using this procedure you will be able to determine exactly which component failed.*

---

**Test Pattern 4:** *Color Alignment Quality Test*

**Upper Test**

**Lower Test**



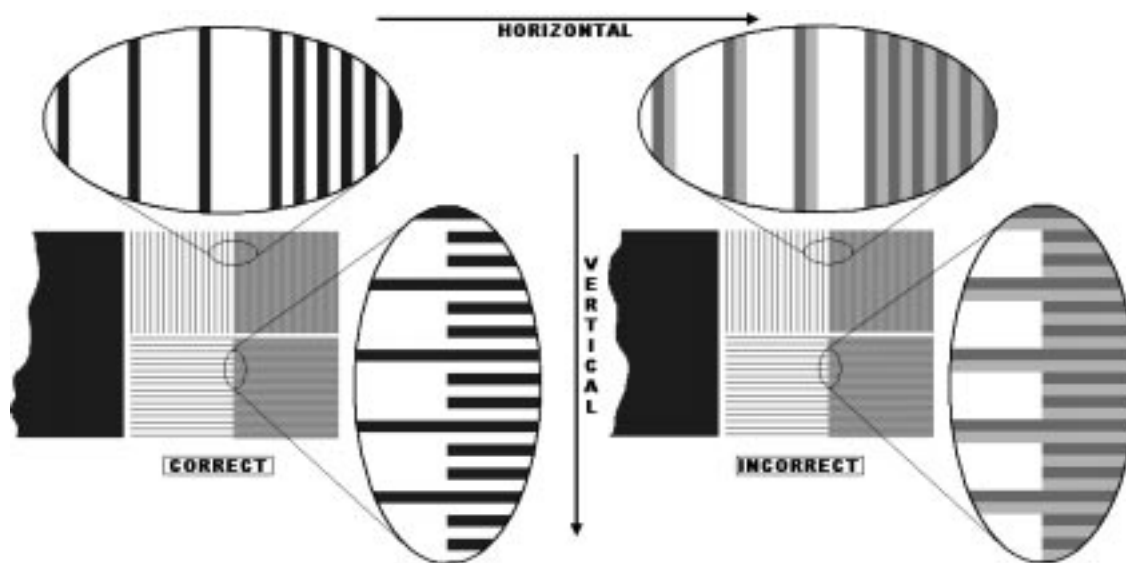


Figure 5

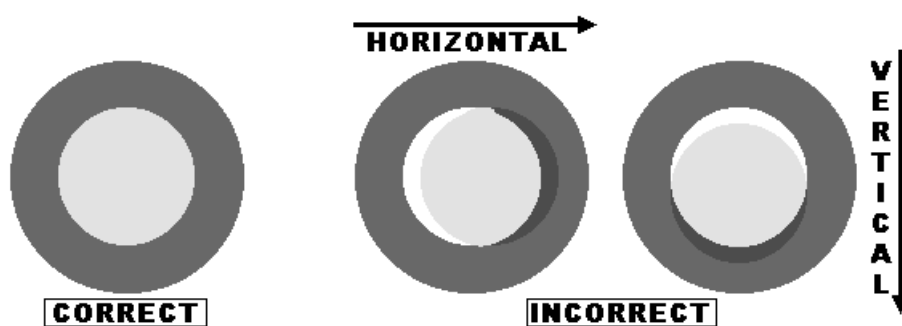


Figure 6

**Alignment Problem:**

**Corrective Action:**

1



2

3 ! # \* ) & ' ) ( \$ ( \* ! ) ' # 2  
 &\$ \$ ) ( \$& \* " ( \* \$ ( #  
 \$ ( &\$ 2 & ) " \$ ( ) \$! # # ( (2 \$ ' \* ) ' (

4 ! # ) ) ( \$ ( 2 # ! ) && ) \$ ("

- \* & # \$&\$ (" & \* "
- \* & # \$ " ' &2 \* "
- \* & # \$ ' &2 \* "

**Only replace one component at a time and check if the problem has gone before replacing another component. Using this procedure you will be able to determine exactly which component failed.**

### Test Pattern 5: Color Variation Test

# \$ \* ) ! ) & % & 2 ( ( 2 && ) ( # ) #  
 ) # ) \$ ) ( & ( # & ) ( \$ # # \* \* ( \$  
 # ! ) ' &\$ ( " )

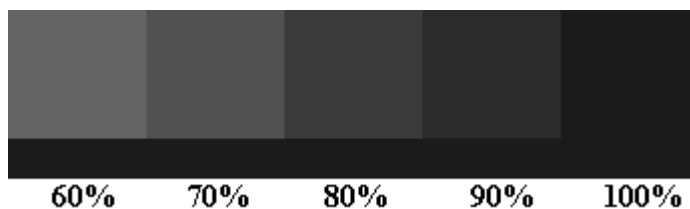
# \* \* ) ) ! # \$ \$ ) ' \$ ( # \* ( # \* \* # \$ ("

) ' \$ \$ & ! ) ' # & ) ( # 2 ) ) # \$ \$ ) ) #

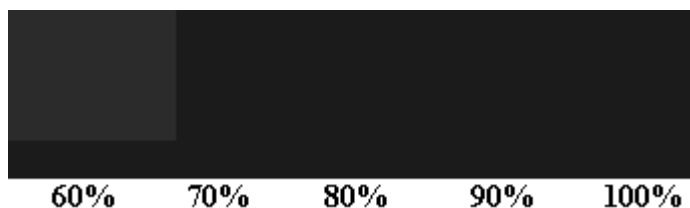
) \$ # \* \$ ) ! \* \* ( &\$ # \* \* # ) \$ ) ( &&2 ) # ) ) \*

)) ( 2 ) \$!! ( # \$ ( # \* \* ) ) ( # ( ' \$ (

# \* ( " &\$ ( " ! ) ' # !\$" # ) \* ) ) ) ' ) ! # )



**Figure 7 (Correct)**



**Figure 8 (Incorrect)**

---

**Variation Problem:**

**never**

**Corrective Action:**

1

2

- 
- 

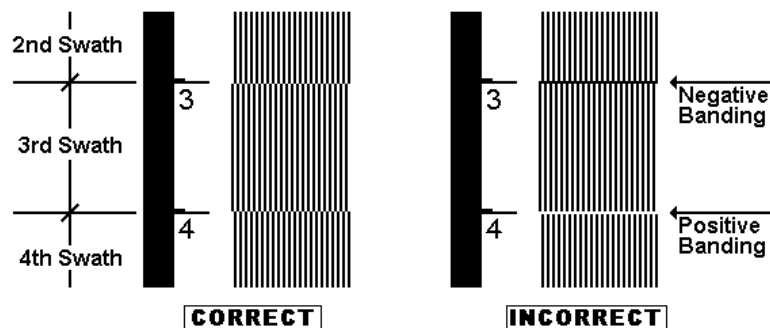
*Only replace one component at a time and check if the problem has gone before replacing another component. Using this procedure you will be able to determine exactly which component failed.*

---

**Test Pattern 6: Banding Test**

**Symptoms**

- 
- 



**Figure 9**



**Cartridge Fault**

- 
- 
- 
- 
- 
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- 
- 

§ Carriage Test



**Printer Fault**

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- 
- 
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- 
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- 
- 



§ Carriage Test

**Media Fault**

$$\left( \begin{array}{c} \text{ } \\ \text{ } \end{array} \right)^{*} \quad \left( \begin{array}{c} \text{ } \\ \text{ } \end{array} \right)$$
$$2 \quad ) \& \& ) \quad ( \quad *$$
[illegible]

***Only replace one component at a time and check if the problem has gone before replacing another component. Using this procedure you will be able to determine exactly which component failed.***

---

## No Printing Defects Found in the Print-Quality Plot

- 
- 
- 
- 

### *User's Guide*

---

## Media

### *User's Guide*

### *Media Guide*

***To have accurate colors, the media settings must match the type of media loaded in the printer.***

***If the customer is using non-HP media with HP drivers, the colors in the required print may not be accurate. Advise the customer to use HP media if they want to improve the accuracy of the colors.***

---

## **STARWHEEL MARKS**

---

## **UNEVEN FILL DENSITY**

### **Symptoms**

### **Product Fault**

- 

### **Media Fault**

### **Solutions**

- 
- 
- 
- 

---

## **SPRAY**

### **Symptoms**

### **Product Fault**

### **Solution**



---

## BLEEDING, BLOOMING AND WICKING

### Symptoms



- **Bleeding:**
- **Blooming:**
- **Wicking:**

### Product Fault

### Media Fault

- 
- 

### Solutions

- 
- 
- 
- 
- 

**Best**

---

## INK SMEARING

### Symptoms



### Product Fault

- 
- 



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## **HUE CHANGES**

### **Symptoms**

### **Cartridge Fault**

### **Solution**

---

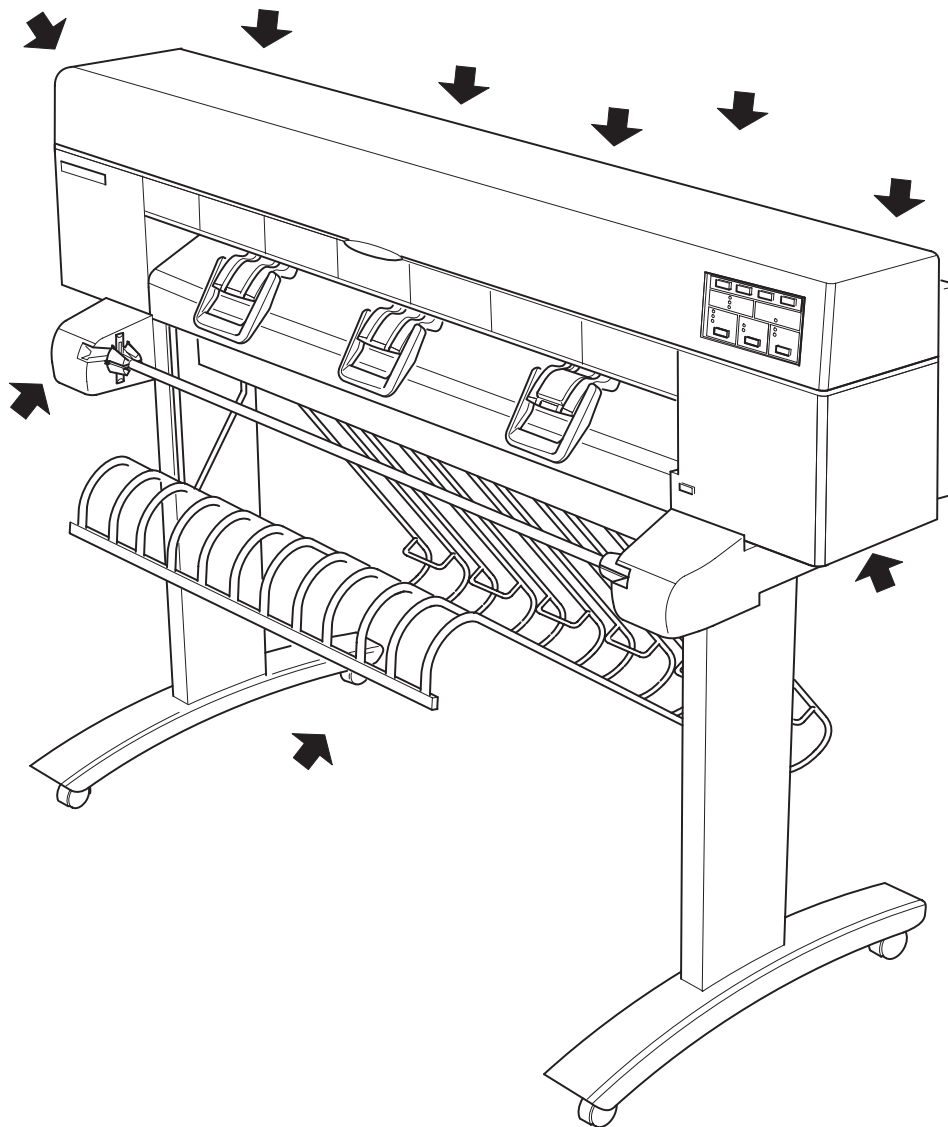
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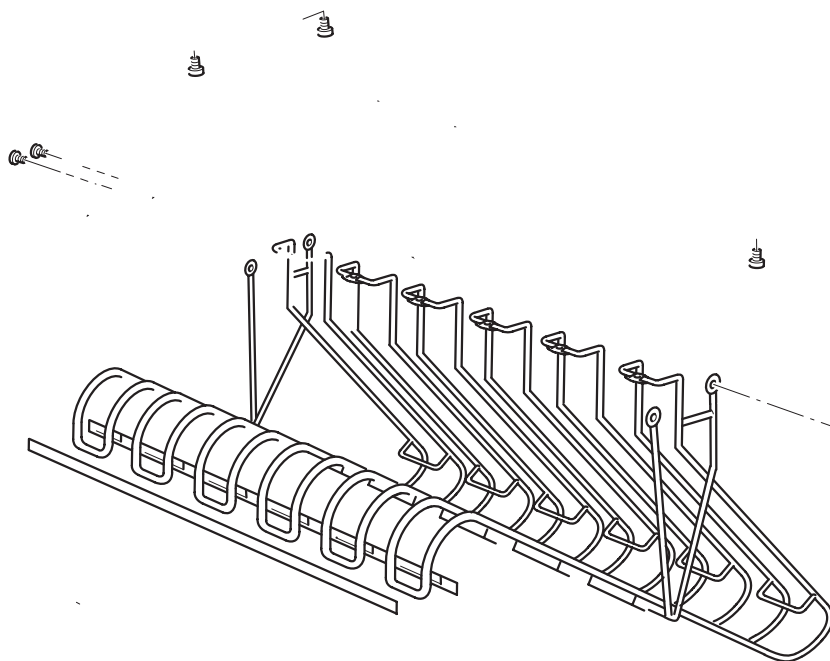


**Figure 1 - General View**

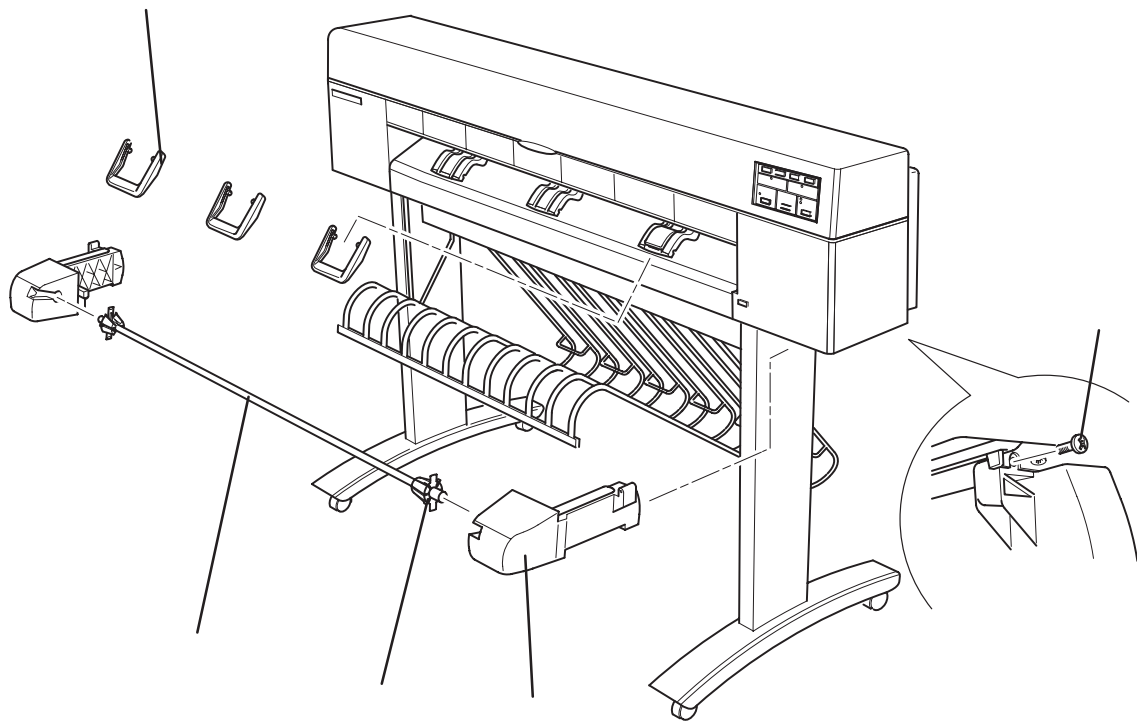
## Figure 2 - Printer Support

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[illegible]

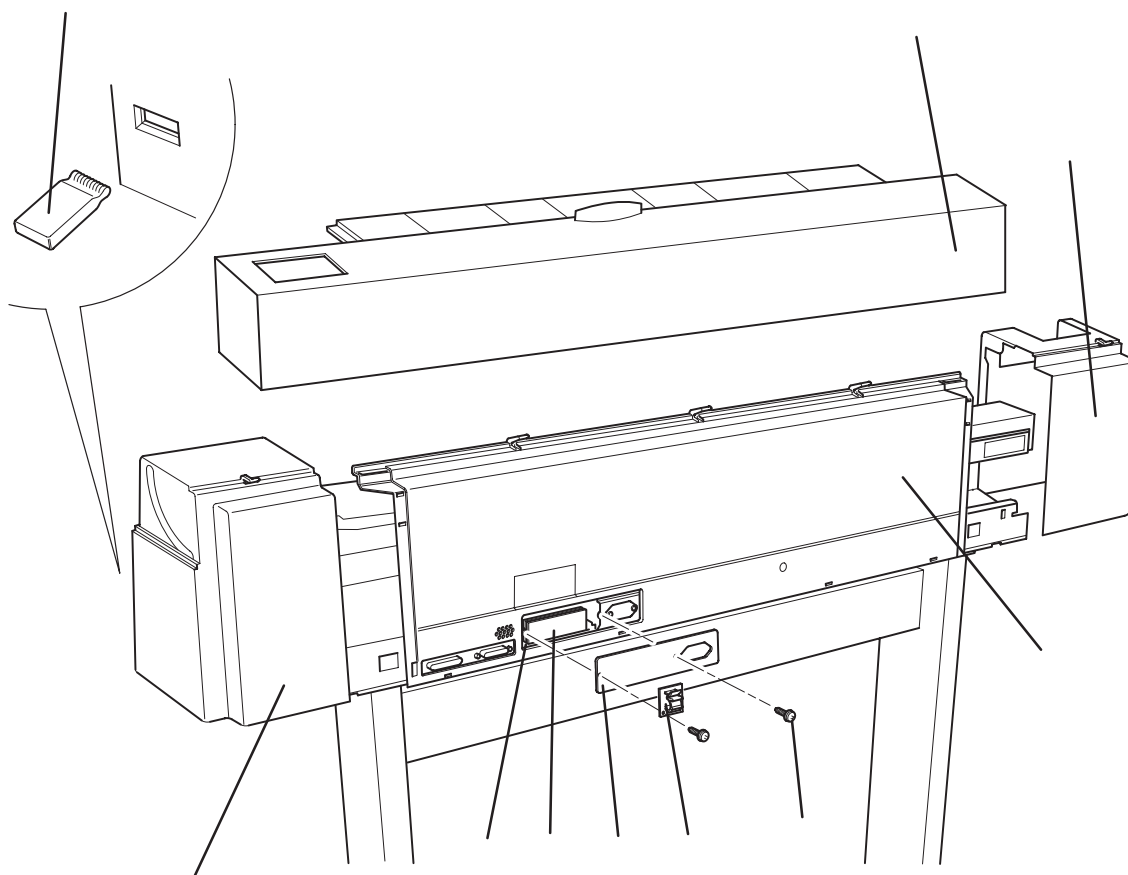


**Figure 3 - Rollfeed Assembly**

## Figure 4 - Covers

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**Figure 4 - Covers**

**Figure 5 - Front Panel, Spittoon and Electronics Module**

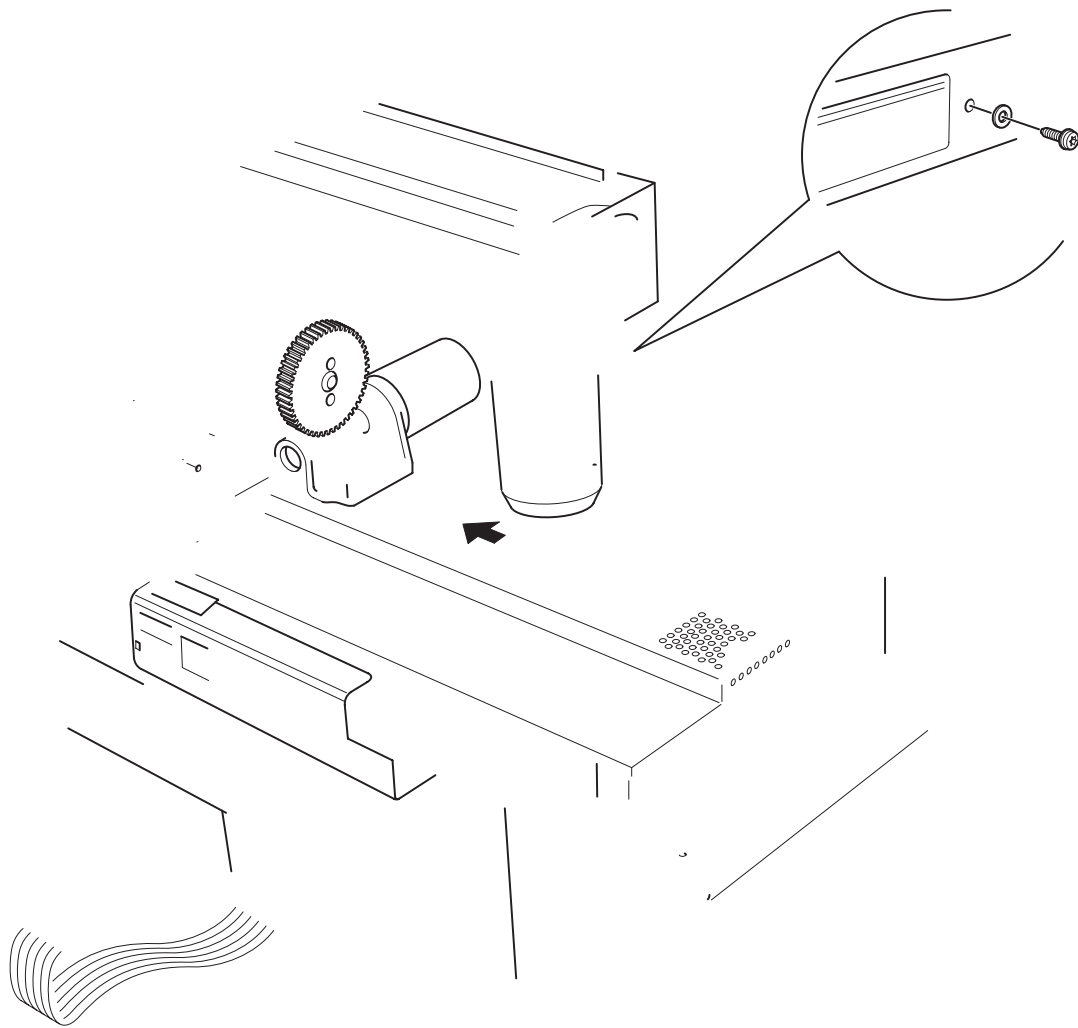
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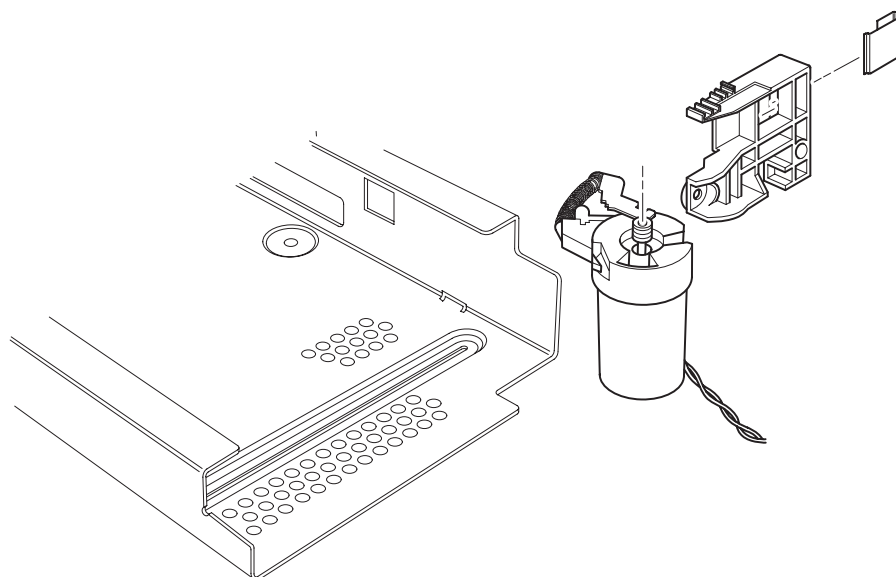




## **Figure 6 - X and Y axis Motors and Encoder Strip**

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## **Figure 7 - Primer Assembly and Service Station Assembly**

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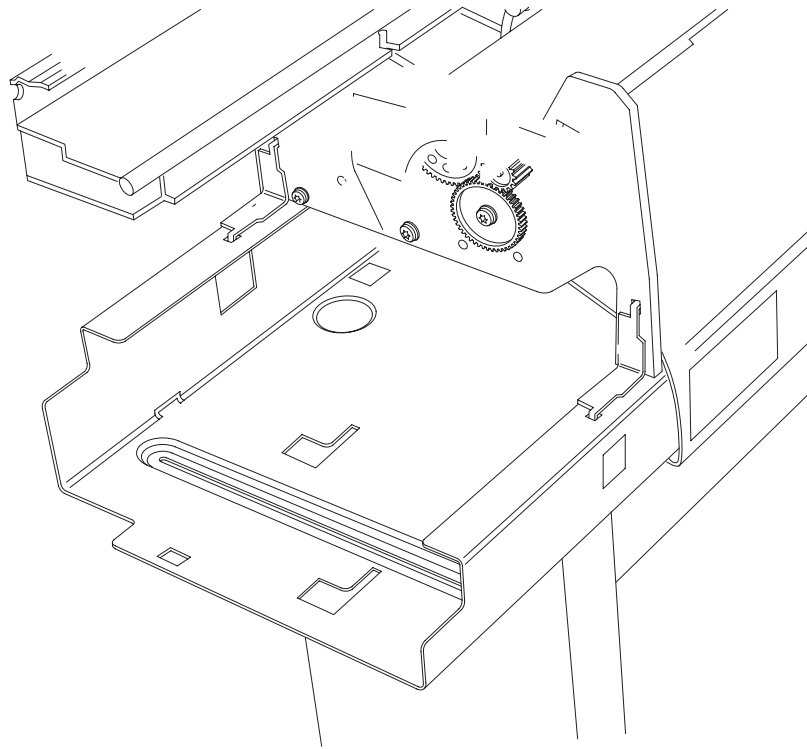
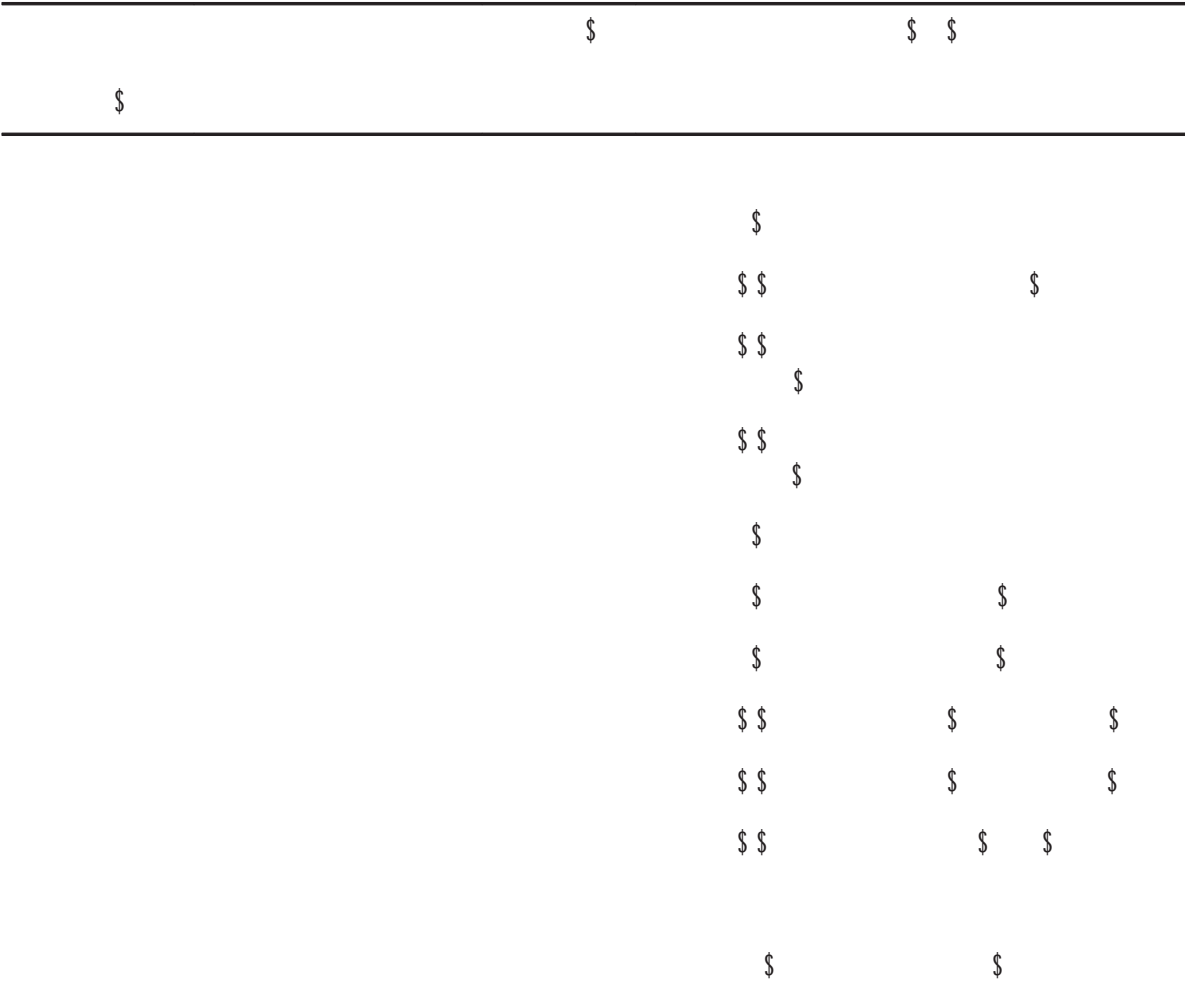
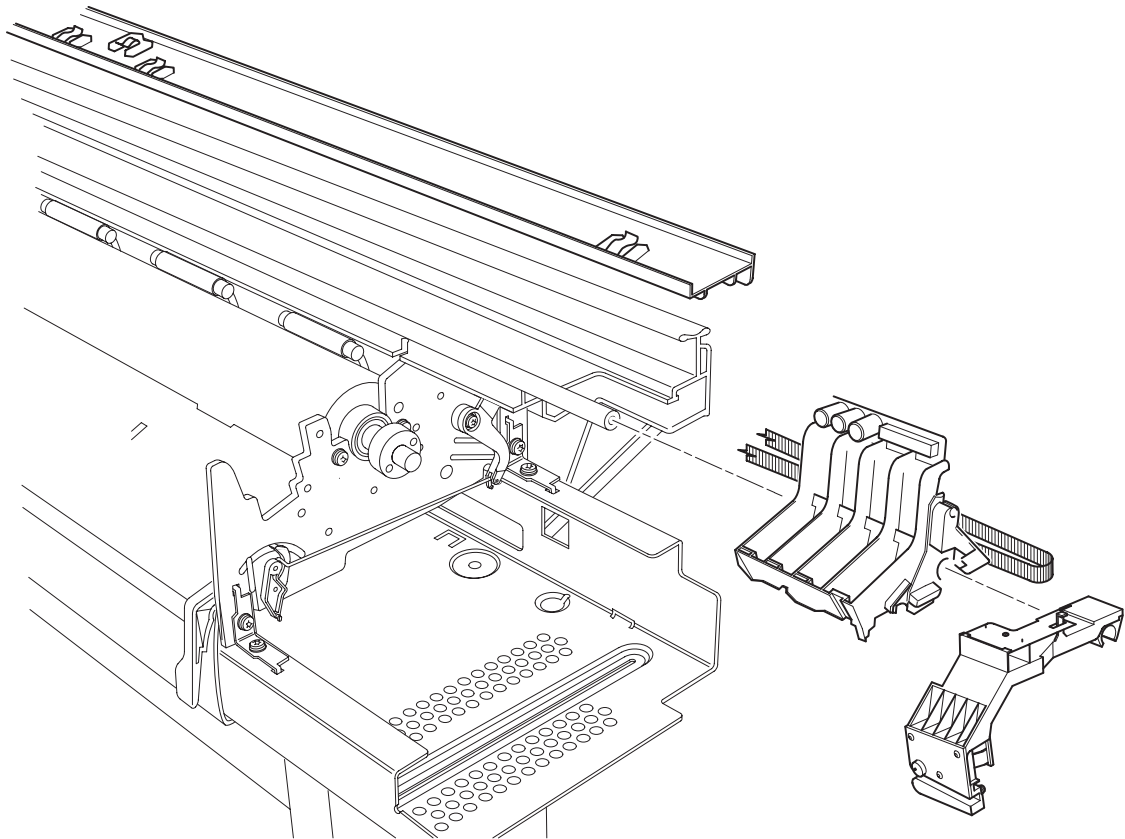


Figure 8 - Carriage Assembly and Trailing Cable



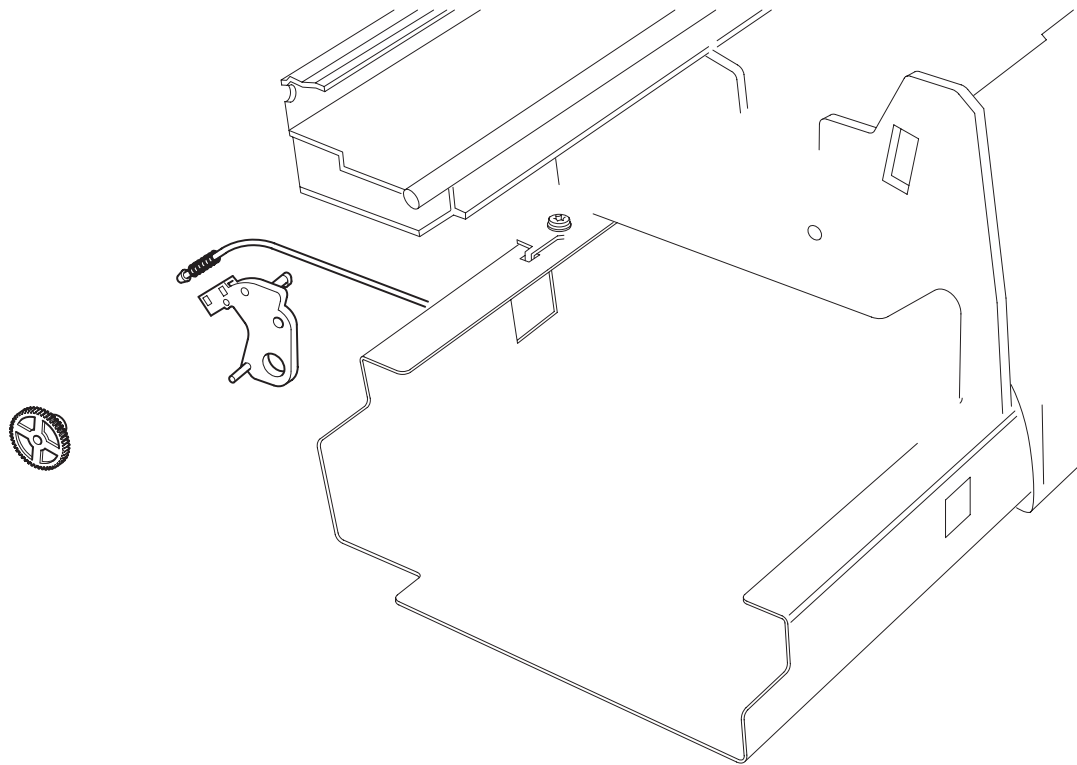


## **Figure 9 - Bail and Overdrive Mechanisms**

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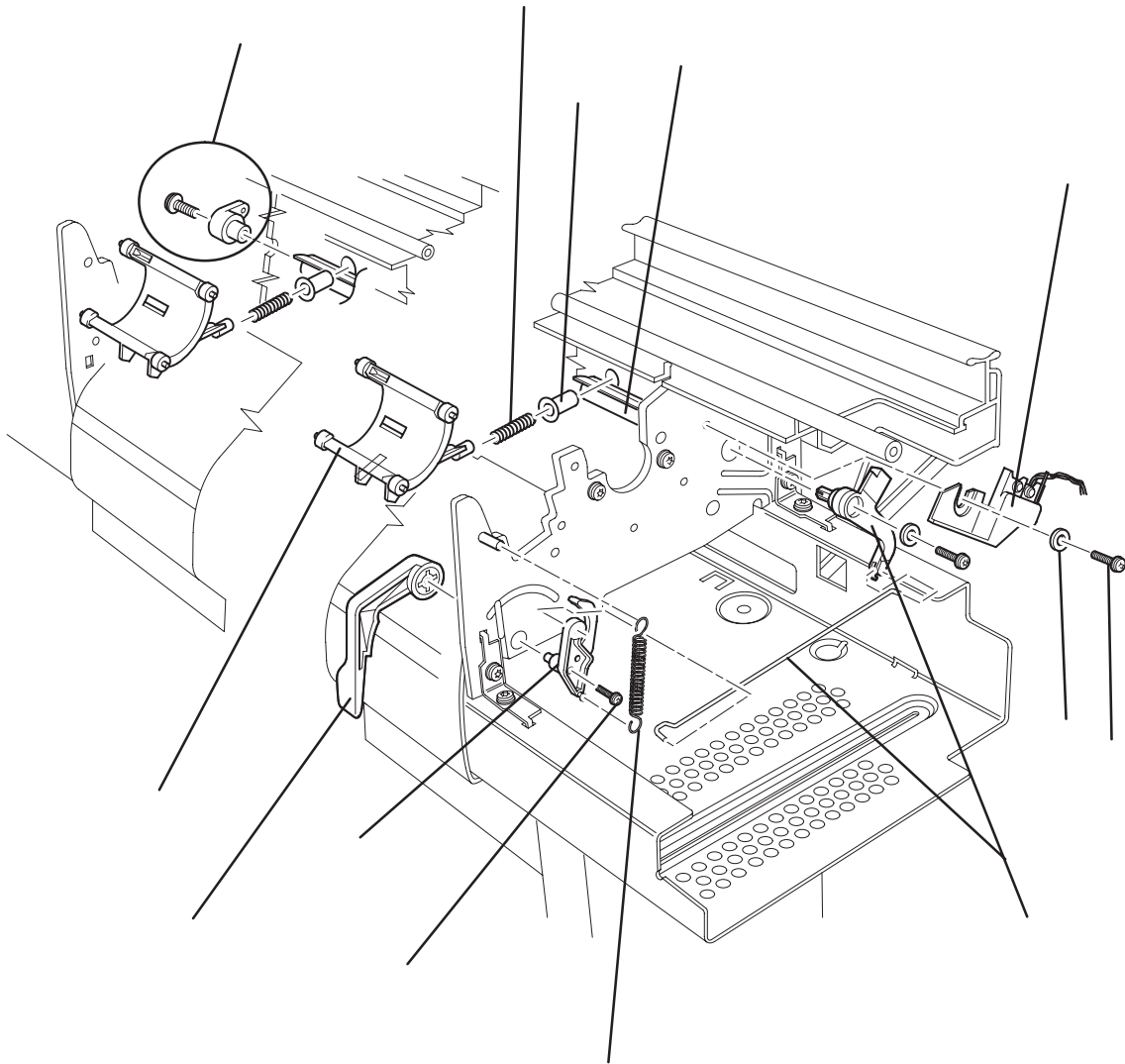




## Figure 10 - Pincharm Assembly

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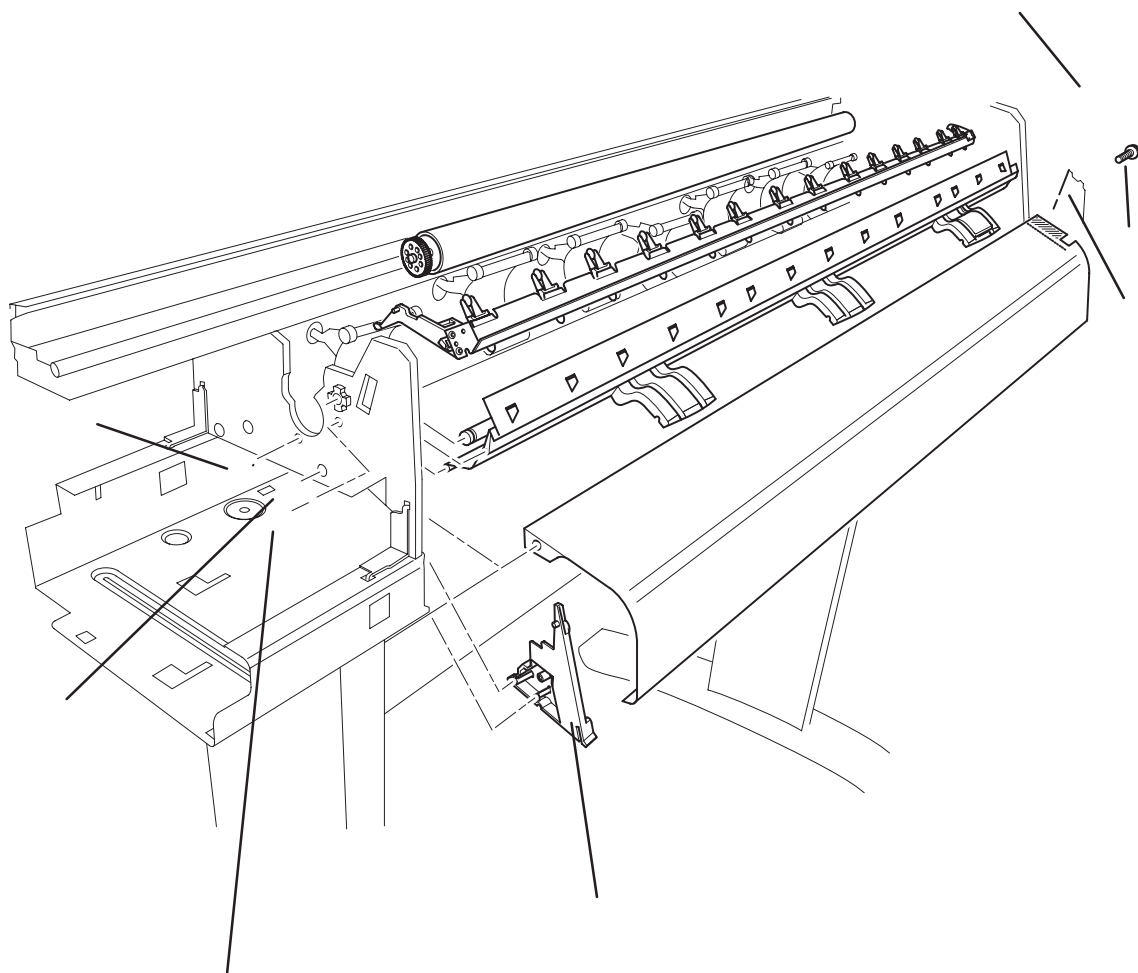
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**Figure 10 - Pincharm Assembly**

## **Figure 11 - Entry Platen, Drive Roller, Bail and Overdrive Assembly**

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Printer Labels

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)	(				
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## **Users Guide and Quick Reference Guide Bundle**

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## **Front Panel Overlays**

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## **Compatible Documentation**

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## **Plug-in memory (RAM SIMM)**

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*Note: For the location of the plug-in memory see page 7-8.*

## **Cartridges**

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## External Print Servers

### Parallel (Bi-Tronics/Centronics) Interface Cables

Computer	HP Part Number	Cable length	Connector type at computer end of cable
HP 9000 workstations, series 300, 400, 700.	C2950A	2.0 m (6.9 ft)	25-pin male
IBM AT, IBM PS/2, IBM PC/XT and compatible computers.	C2951A	3.0 m (9.8 ft)	25-pin male

### Serial (RS-232-C) Interface Cables

Computer	HP Part Number	Cable length	Connector type at computer end of cable
HP Vectra or HP 24541A/B serial interface card (9-pin connector). HP 9000 workstations using 9-pin connectors. IBM AT and compatible computers using 9-pin serial connectors.	24542G	3.0 m (9.8 ft)	9-pin female
HP Vectra PC with HP 24541A/B dual serial interface card using the 25-pin connector. HP Apollo workstation using an SPE (Serial/Parallel Expansion) option and supplied adapter cable. DEC VAX. Sun workstation.	17255M	1.2 m (3.9 ft)	25-pin male
IBM PC, PC/XT, IBM PS/2 and compatible computers	C2913A	1.2 m (3.9 ft)	25-pin female
DEC VAX using DEC BC22D, BC03M, or equivalent	17355M	3.0 m (9.8 ft)	
Apple Macintosh Plus, SE, II Series, Classic, LC family, Quadra family, PowerBook, PowerMac	17302A	1.5 m (4.9 ft)	8-pin male mini-DIN
Apple Macintosh 128K and 512K	92219M	1.5 m (4.9 ft)	9-pin male
Extension cable	31391A	5 m (16.4 ft)	25-pin female



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<b>Section Contents</b>	<b>page</b>
Introduction .....	8-3
Reassembly .....	8-3
Safety Precautions .....	8-3
Electrostatic Discharge (ESD) Precautions .....	8-4
Required Tools .....	8-5
Installing a RAM or ROM SIMM .....	8-6
Removing the Bail Assembly .....	8-7
Removing the Top Cover .....	8-8
Removing the Rollfeed Assembly .....	8-9
Removing the Left End-Cover .....	8-10
Removing the Right End-Cover .....	8-11
Removing the Front-Panel Assembly .....	8-12
Removing the Electronics Module .....	8-13
Removing the Encoder Strip .....	8-15
Removing the Right Bracket .....	8-17
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Removing the Trailing Cable .....	8-34
Removing the Trailing-Cable Guide .....	8-36
Removing the Carriage Assembly .....	8-37
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Removing the Entry Platen .....	8-52

---

**Before using this chapter to remove and install a new component, always make sure that you have performed the relevant service test from Chapter 4. If the test passes you will not need to replace the component.**

**remove**  
**reinstall**



---

**WARNING**

**Serious shock hazard leading to death or injury may result if you do not take the following precautions:**

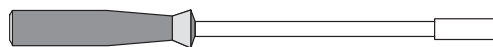
**Ensure that the ac power outlet (mains) has a protective earth (ground) terminal.**

**Switch the Printer off, and disconnect it from the power source prior to performing any maintenance.**

---

**Prevent water or other liquids from running onto electrical components or circuits, or through openings in the module.**





T8



T9



T10



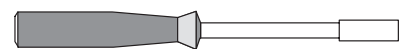
T15



T20



T25



3/16  
inch

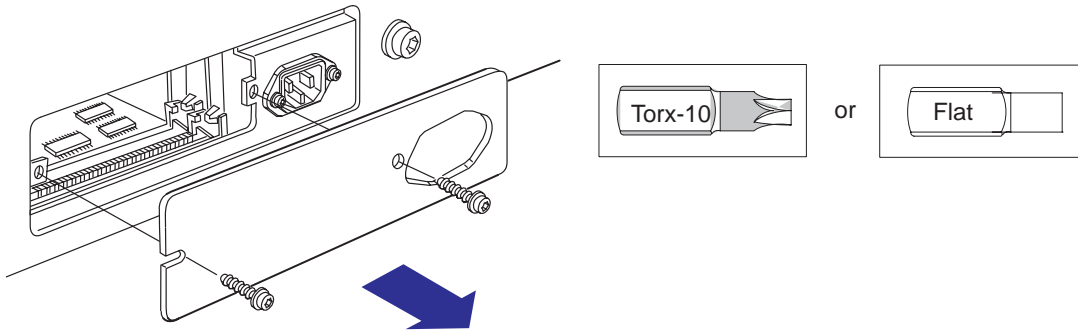
and



5.5  
mm

---

*A RAM SIMM provides the Printer with extra memory. A ROM SIMM contains new firmware code to override the internal firmware code.*



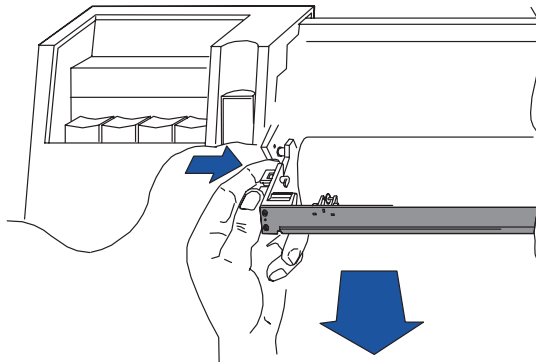
**Before handling a SIMM, either put on a grounding wrist strap and attach the end to the metal chassis of the Printer, or touch the outer metal surface of the Printer with your hand. Otherwise, static electricity from your body could damage the SIMM.**



---

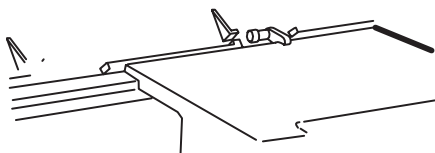
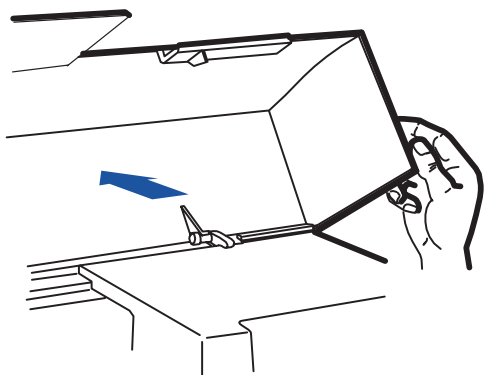
## Removal

*If the Mark Encoder (the white plastic part installed on the left hand side of the Drive Roller) prevents you from removing the Bail Assembly, use the Media-Axis Test (details ► page 4-16) to turn the Drive Roller to a position where the Bail Assembly can be removed easily.*



## Installation

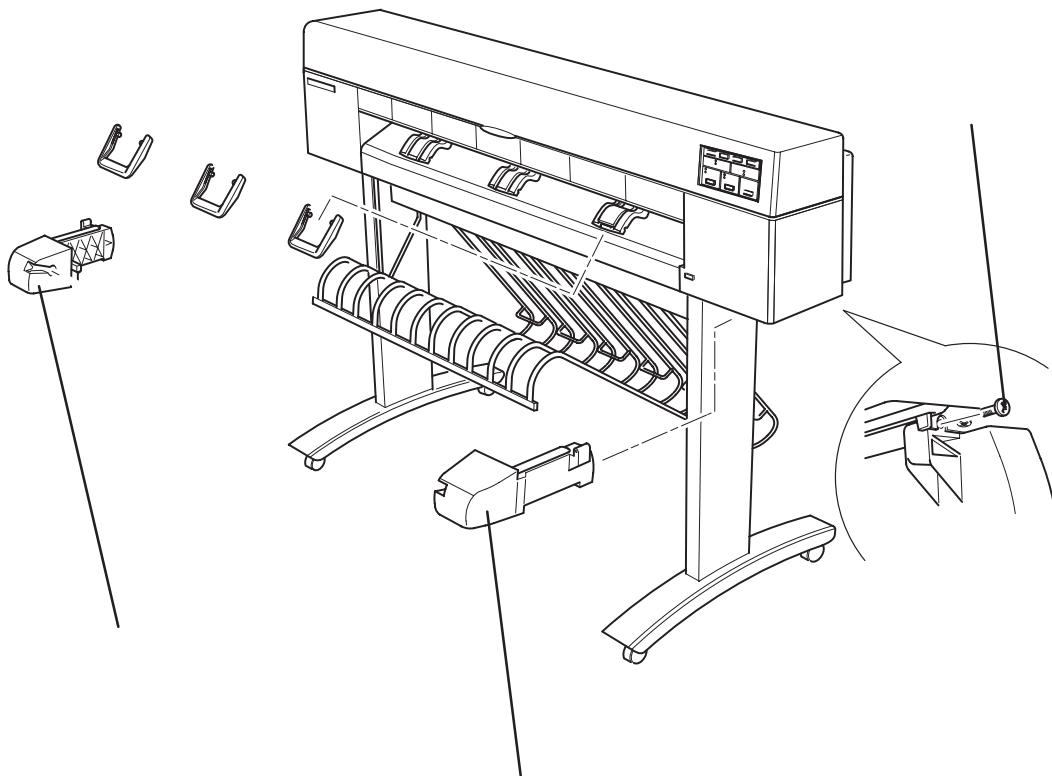




---

*Refer to figure 1.*

## **Removal**



**Figure 1: Rollfeed Assembly**

---

## Removal



*These may be stiff.*



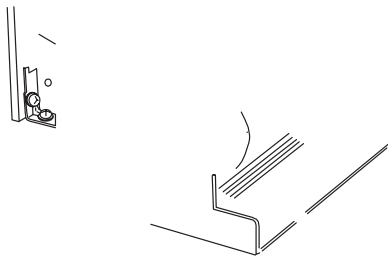
---

*Refer to figure 2*

## **Removal**



*These may be stiff.*



---

## Removal



**Remember that the clip must not be removed completely. If removed completely, the clip will be destroyed.**

## Installation

**REMEMBER THAT PULLING THE CABLE WITHOUT  
RELEASING THE BROWN OR BLACK CLIP WILL  
DAMAGE THE CONNECTOR IN WHICH CASE IT WILL  
DESTROY THE COMPLETE ELECTRONICS MODULE.**

---

' ) \$( " # & ) ( \$ ) &

Refer to figure 3 ♦ \* "

### Important Information

# \$( ! \$ ' \$ ) ( \$( \$ # ) ( ! & # # %  
)! # \$( ) ) ( ' % \$( \$ # & ) ( \$ ' ) & #  
! \$ ' 3 \$ \$ ) ( & & ! ) ' \* & \$ \* \$( 2 # \$( ) ( #  
\* # ( ) ( # \$ ) ( ! \$ " ) ( \* & ) # \$ \$ ) ( & & \$ & )  
\* \$( ) ( & & ) ( 2 ! & # ) ( ) ) \* ( # & ) ( \$  
' ) &

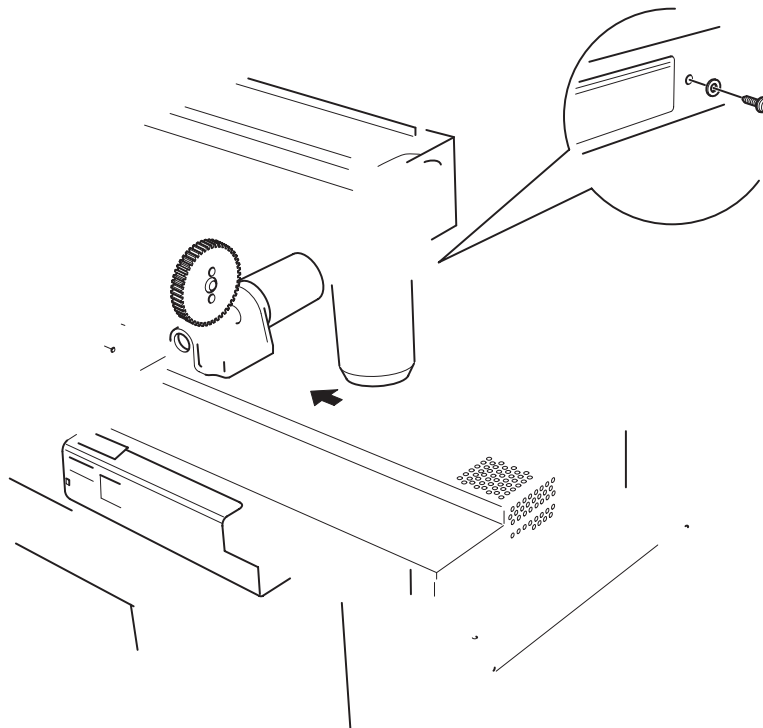
**Important** # ( \* & \$( " # & ) ( \$ ' ) & & 2 ' ' )  
# % # ! \$ ' \$ \$ ) ( & & ) ! # **new** & ) ( \$  
' ) & # \$ \$ ) ( & & \$ & \$ \* \$( ) ( # ) \* ! ) !  
# ' ) & & ) # % # ! \$ ' \$ \$ ) ( & & ) ! #  
\$( & \$ ( # **old** & ) ( \$ ' ) & \$ # # \$  
\$( ! ) ' \$ ) ( 2 ) ' ) # ! ) & ) \$( "  
  
! # ! \$ ' \$ \$ ) ( & & ) ! # \$( # ) &  
& ) ( \$ ' ) & \$ **lower** # ( # ! \$ ' \$ \$ ) ( & & ) !  
# ( & ) ( \$ ' ) & # ( 2 ) **must not** \$( & & #  
\$( ) # ' ) &  
  
! # ! \$ ' \$ \$ ) ( & & ) ! # \$( # ) &  
& ) ( \$ ' ) & \$ **higher** # ( # ! \$ ' \$ \$ ) ( & &  
)! # ( & ) ( \$ ' ) & # ( 2 ) **must** \$( & & #  
\$( ) # ' ) &  
  
' \* & # ! \$ ' \$ \$ ) ( & & \$  
( # ! \$ ' \$ \$ ) ( & & ) ! # & ) ( \$ ' ) & \$  
) & # & ) ( \$ ' ) & **without** #  
\$( & &  
  
' \* & # ! \$ ' \$ \$ ) ( & & \$  
( # ! \$ ' \$ \$ ) ( & & ) ! # & ) ( \$ ' ) & \$  
) & # & ) ( \$ ' ) & **with** #  
\$( & &

### Removal

*The electronics module is a field-replaceable part. You do not need to open it. If it is faulty, exchange it for a new one.*

' ) # \$ " # ( 3 ) ♦ \* " 3  
\$ ) ( ( # ! ) ( 3 \* ( & ' & 2 ! ) ' # ' \$(  
( # ) \* & # % ) ! # \$( ( ' ) \$  
' ) ) ( \$ ' ( # \$ ' ! ) ' # % )

*Prevent tugging on the cables at the point of connection by leaving slack between the connectors and the clips.*





---

' ) \$( " # ( ) \$\*

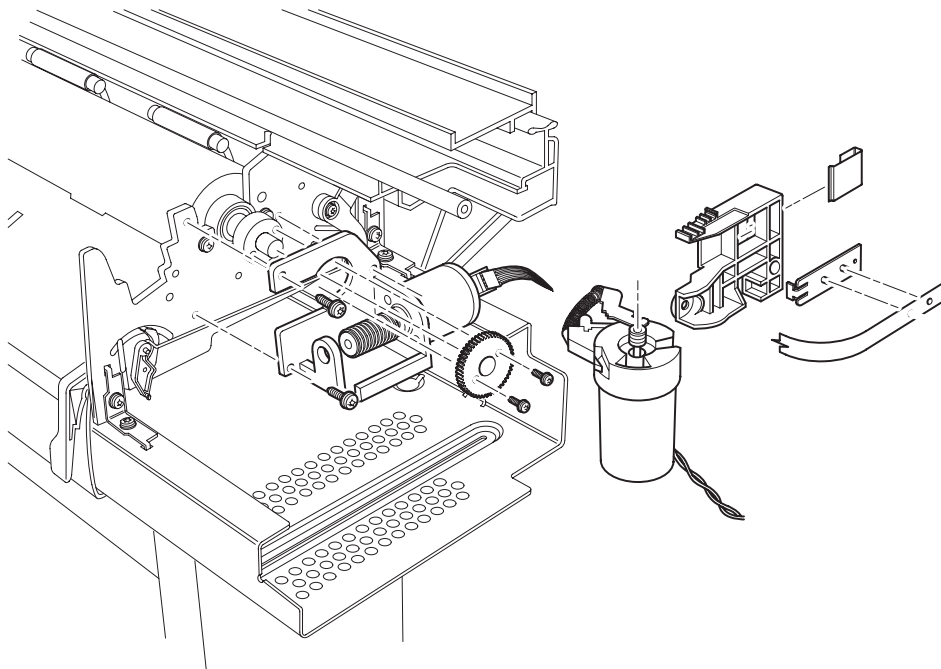
Refer to figure 4 ➡ \* "

## Removal

) # \$ " \$ " ) # & ! ) # \$ \$(  
' ) # \$"# ( ) ➡ \* "  
' ) # & ! ( ) ➡ \* "  
\$ )( ( # \$\$\$( " & ! )' # ' \$( ( ! )' # " \$ )(   
# \$"# % )& # \$\$\$( " & \* ( ) \$ )( #   
\$\$\$( " & " \$  
( # \$"# # ( \$ ' ) # ) ( \$ ' ' # #   
( ) \$\* \$ ' ) # ( ) \$\* \* \$( " \$ '   
' ) # \$ ' ( # \$ ' # # ( ) \$\*  
) # & ! % \$ '  
)' \* \$( " # ( ) \$\* \* \$( " ) & ( \$ )( ( # ( )  
\$\* ! && & # ( ) \$\* ! )' # \*\$( )( # \*\$( "  
! && & # ( ) \$\* ! )' # & ! %  
! && \* && # ( ) \$\* ) # \$"# # ) "# ( ) )! #  
\$ " ' & ( & \$ )( !& !

## Installation

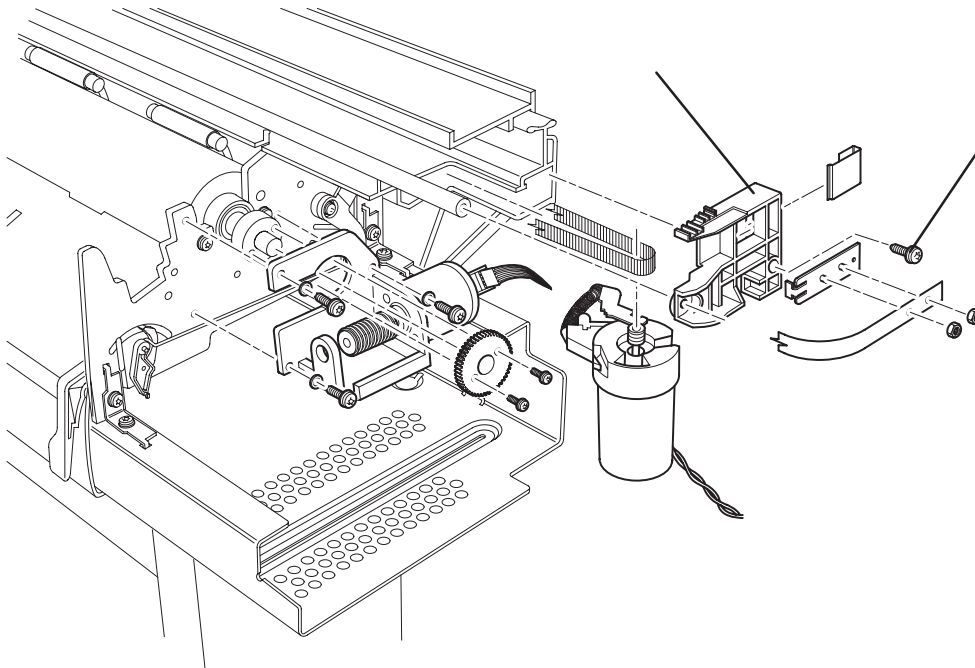
) # \$ " \$ " ) # & ! ) # \$ \$(  
( # # ( ) \$\* \$ ) \$ ( \$ # # ( \* ( \*  
# ( ) \$\* # ) "# # \$ " \$ " ! )' \$"# ) & !  
' \*) \$& # &)) \$\* ! & )( # \$ )&&  
&\$\* # & ! ( )! # \$\* ) # \*& \$ \*\$( )( # & ! % \$ '  
( \* \$ \$"# ) # )! # \*\$(  
) ) & !\$ ) ( ) \$"# ( # # \$ ' ( \$ ' )  
\$( # ( ) \$\*  
&\$\* # \$"# \$ )! # ( ) \$\* \$ ' ) # ) \*\$( )( #  
( ) \$\* \* \$( " \$ ' ( \*& # ) ( \$ ' ) ( #  
\$"# \$ ( &\$"# & \$"# ( # (   
&\$"# & \$"# ( # \$ ' ) ( # & ! \$  
&\$ # \$ " % ( ! ) # # & ( " # )! \$ & ) ( !  
' ) ' ( # ( ) \$\* # ) & ( ) \$( ) ) ( # \$ "



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*Refer to figure 5.*

## **Removal**



**Figure 5: Right Bracket**

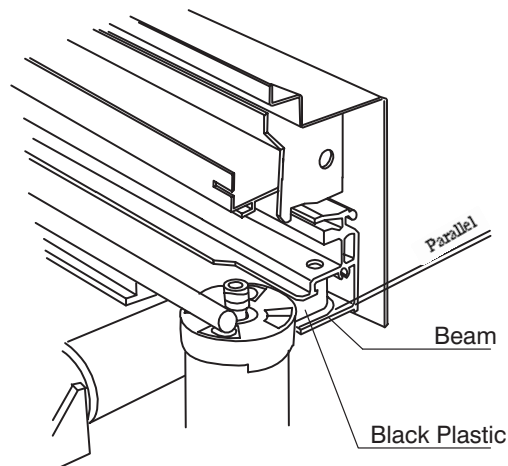
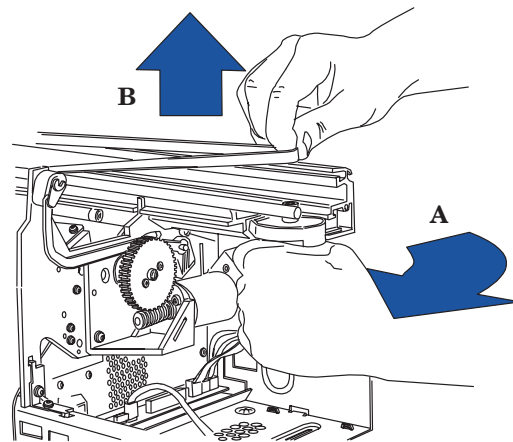
---

## Removal

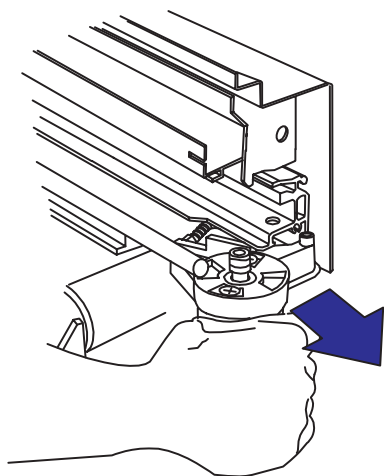


*In the following step, take care not to break the black plastic tab on top of the motor.*

*If you need greater maneuverability of the motor, press the black plastic tab on top **very slightly** downwards.*

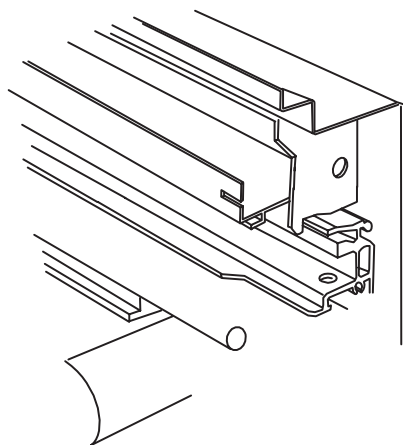


*The motor may be stiff.*



## Installation

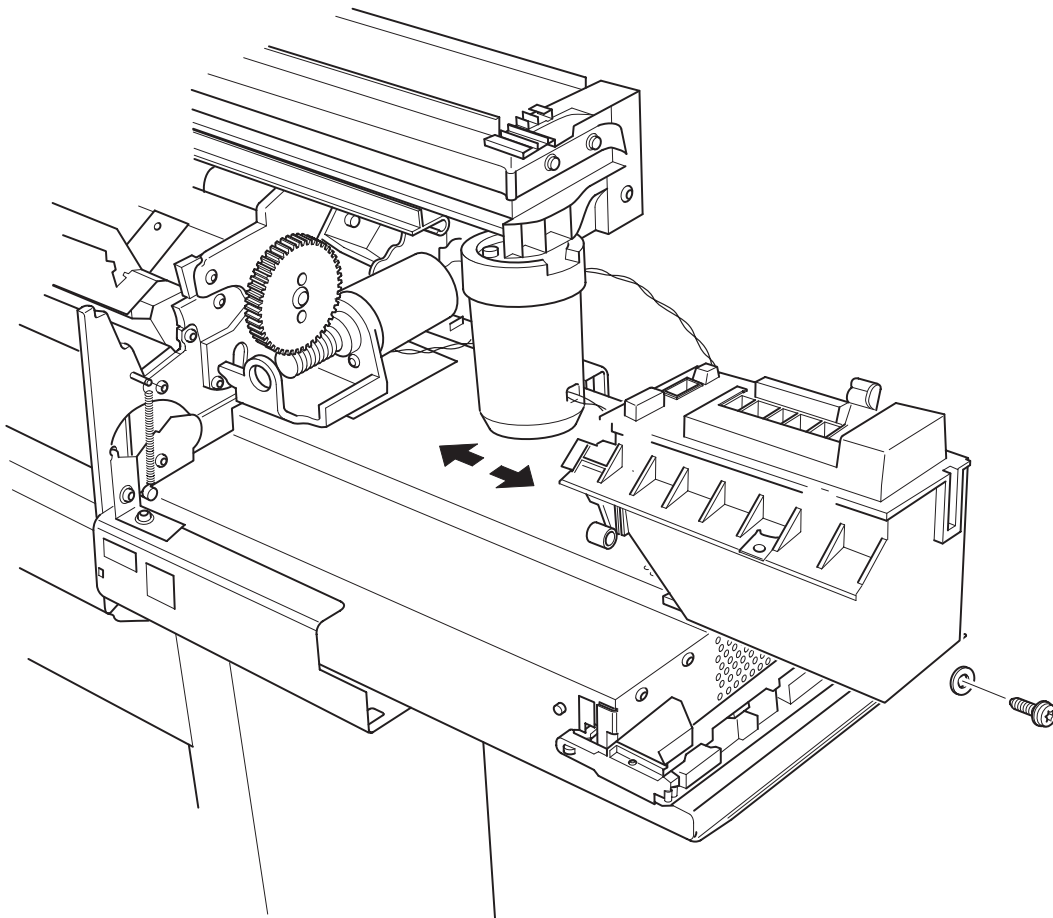
**inside**



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*Refer to figure 6.*

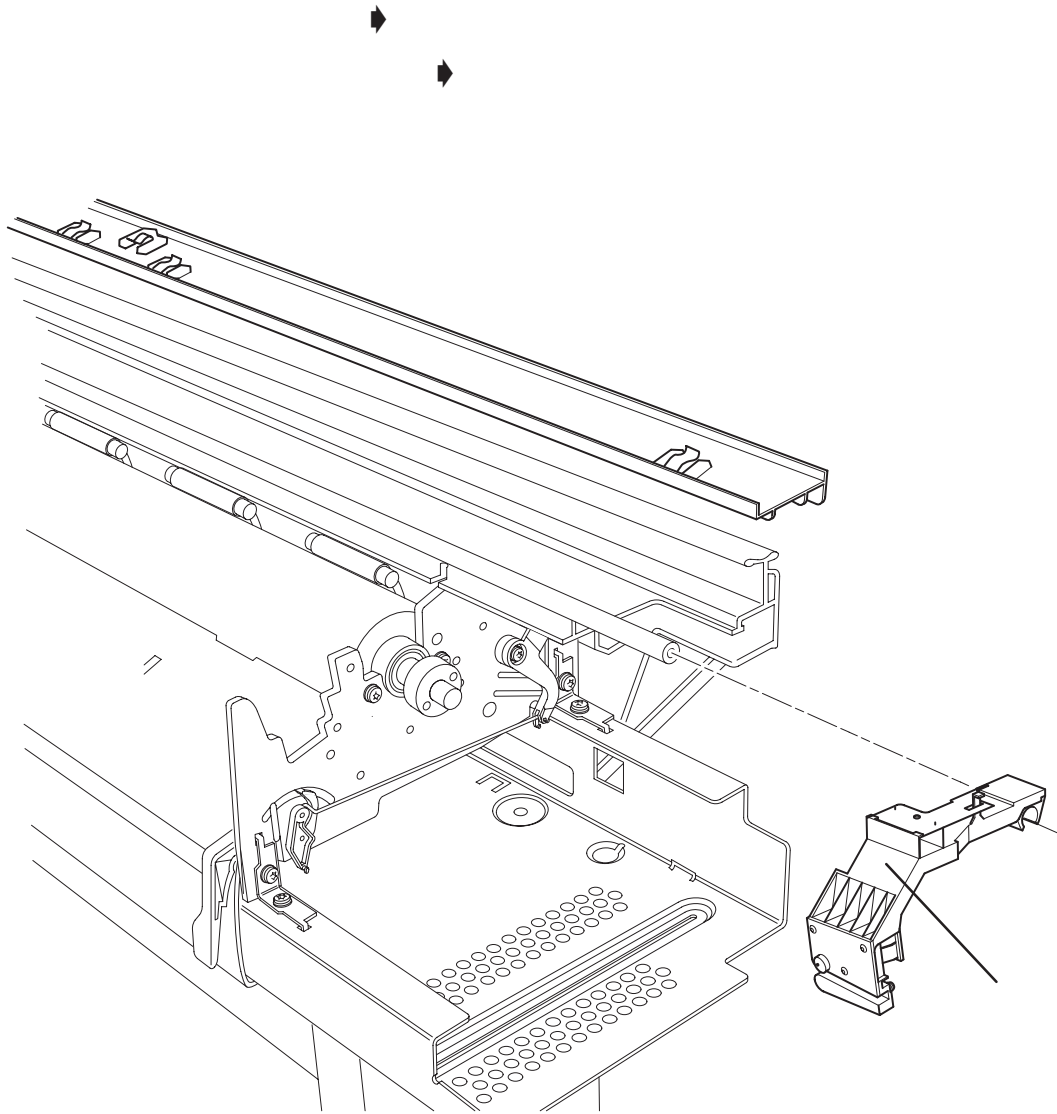
## **Removal**



---

*Refer to figure 7.*

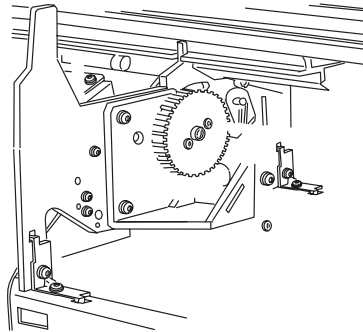
## **Removal**



**Figure 7: Cutter Assembly**

---

## Removal





---

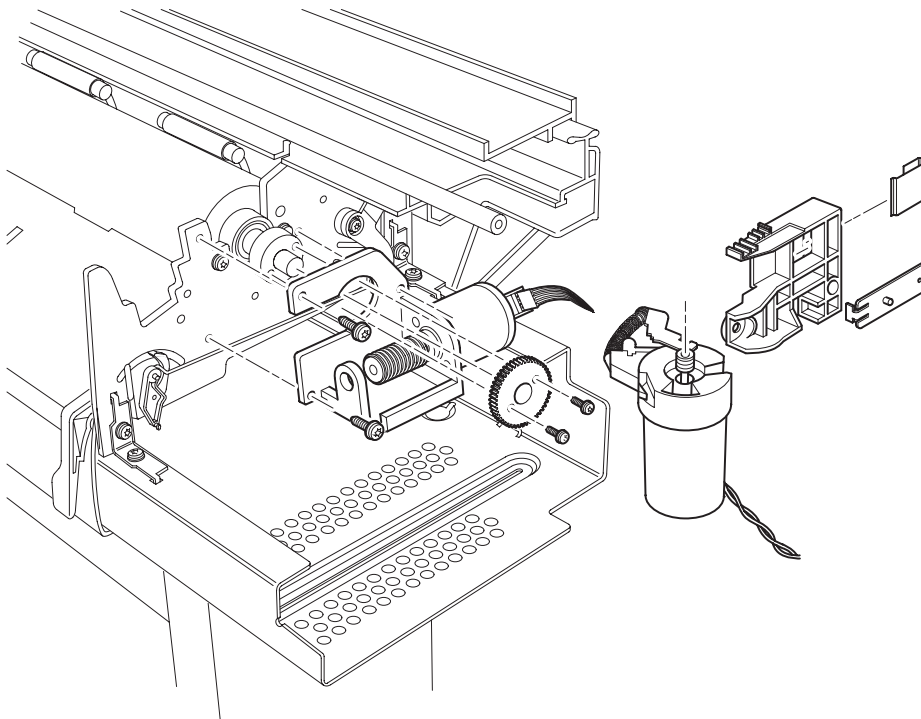
*Refer to figure 8.*

## Removal



**Reassembling:** *The worm pinion and drive-roller gear mesh slightly during use. Don't install a new motor and an old gear, or vice versa: **install the gear that comes with the motor.** Apply the grease that comes with the new motor to the worm pinion and drive-roller gear.*

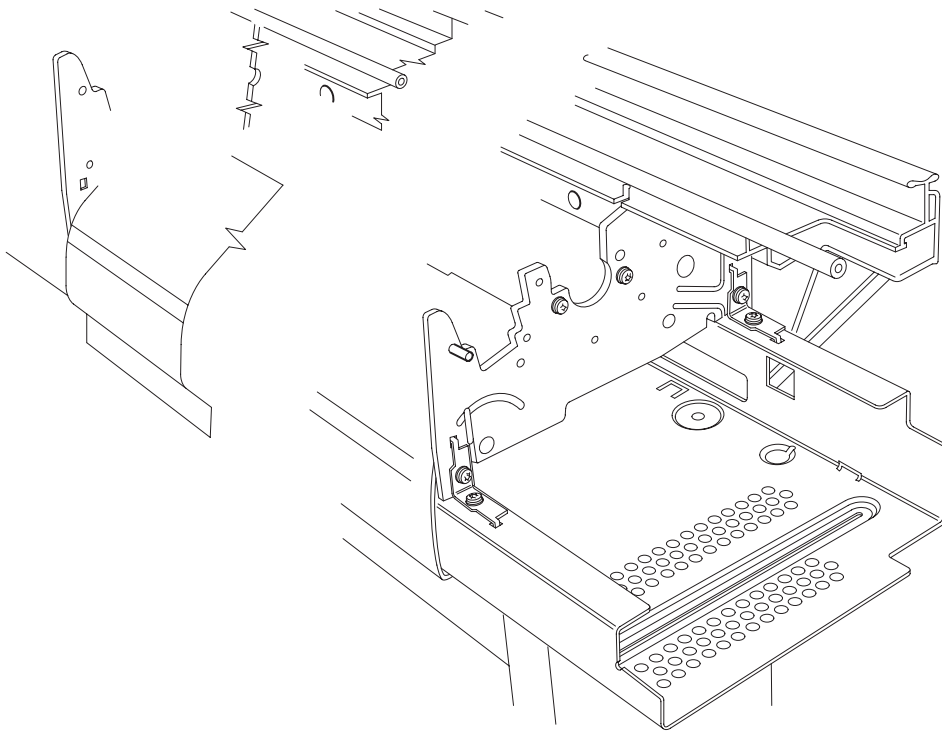
**Calibration:** *After having reassembled the Printer, perform the accuracy calibration (Details ▶ chapter 5.)*



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*Refer to figure 9.*

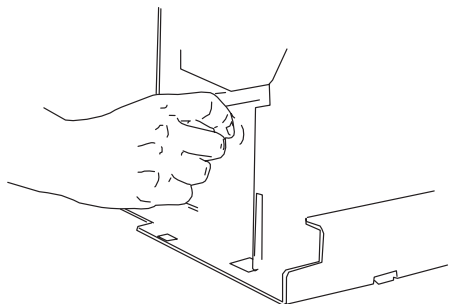
## **Removal**



---

## Removal

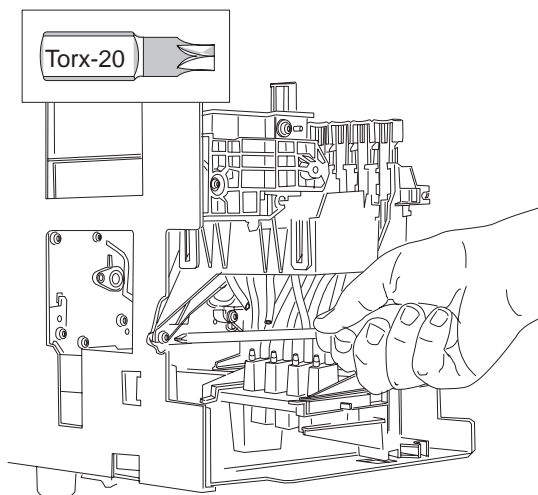
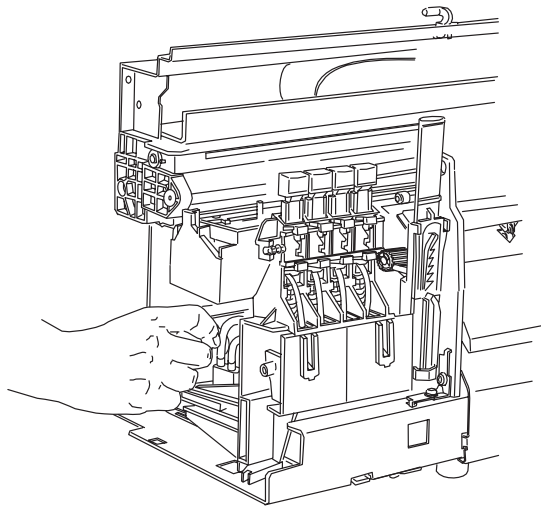
short

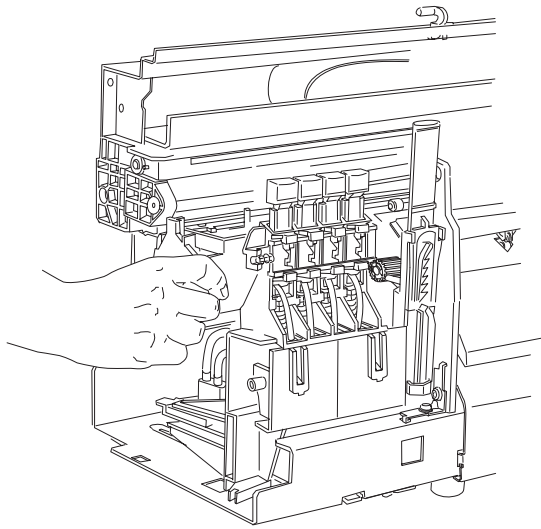


---

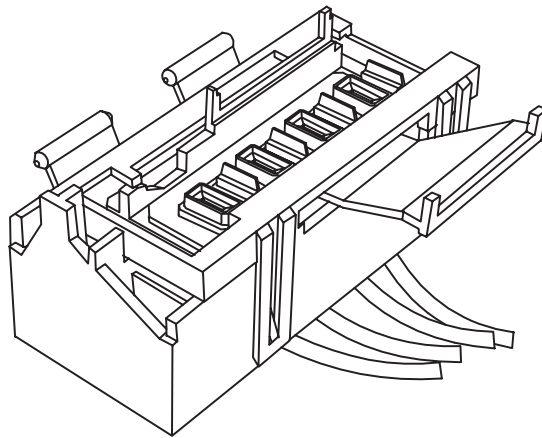
## Removal

➡  
**short**





*The service station is one orderable assembly. Do not open it.*



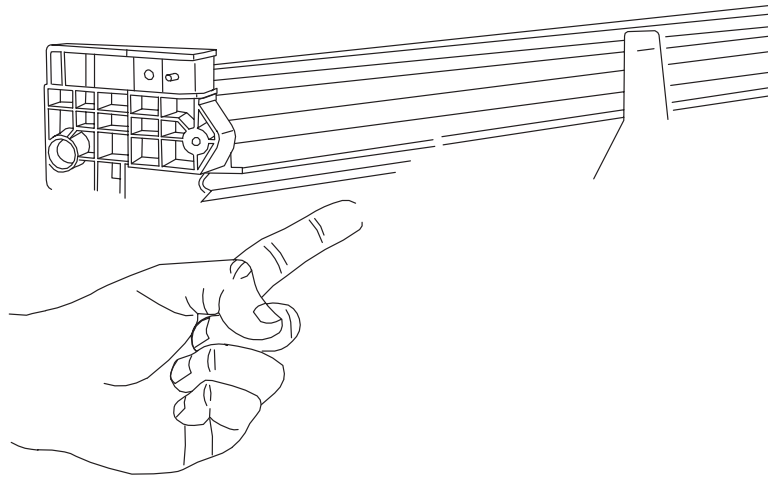
**Reassembling:** *Ensure that the cartridge caps are clean, the wipers straight, and the openings clear.*

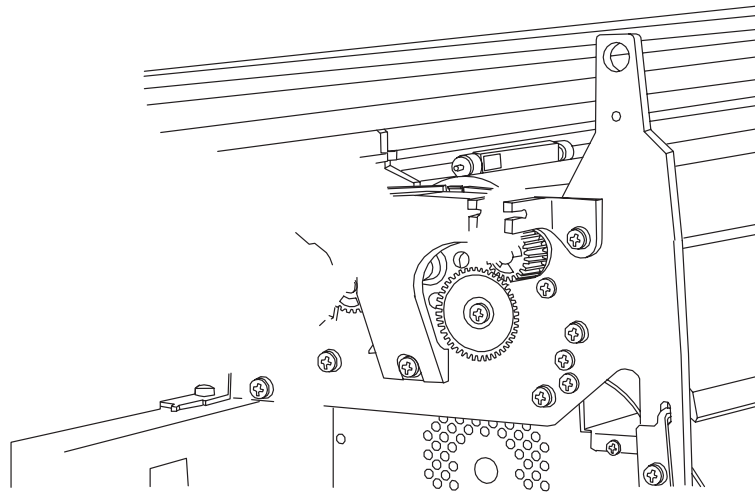
---

## Removal



## While

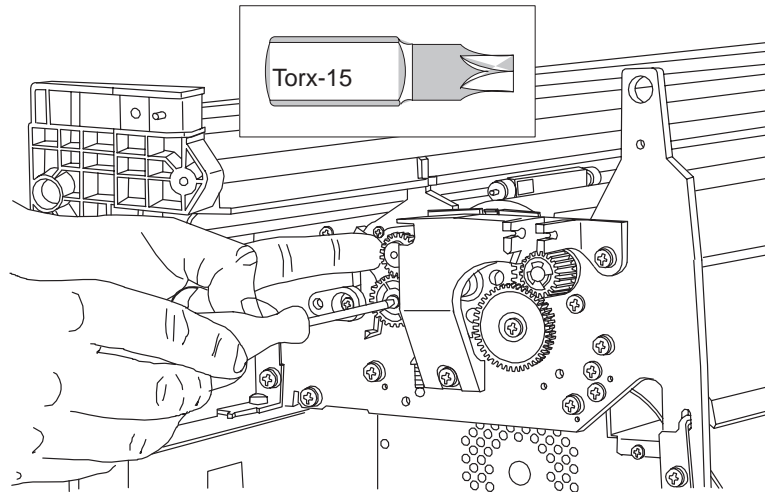




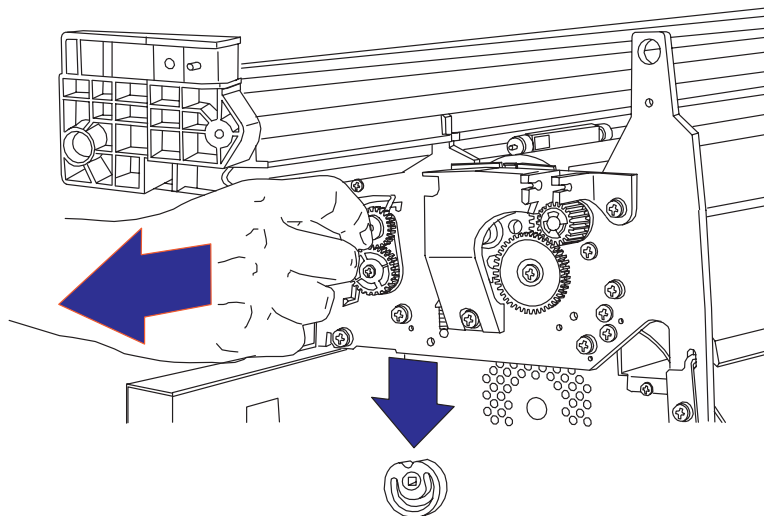




*You may need to hold the bail cam steady inside the side-plate at the same time. You can access the cam through the hole underneath the side-plate.*

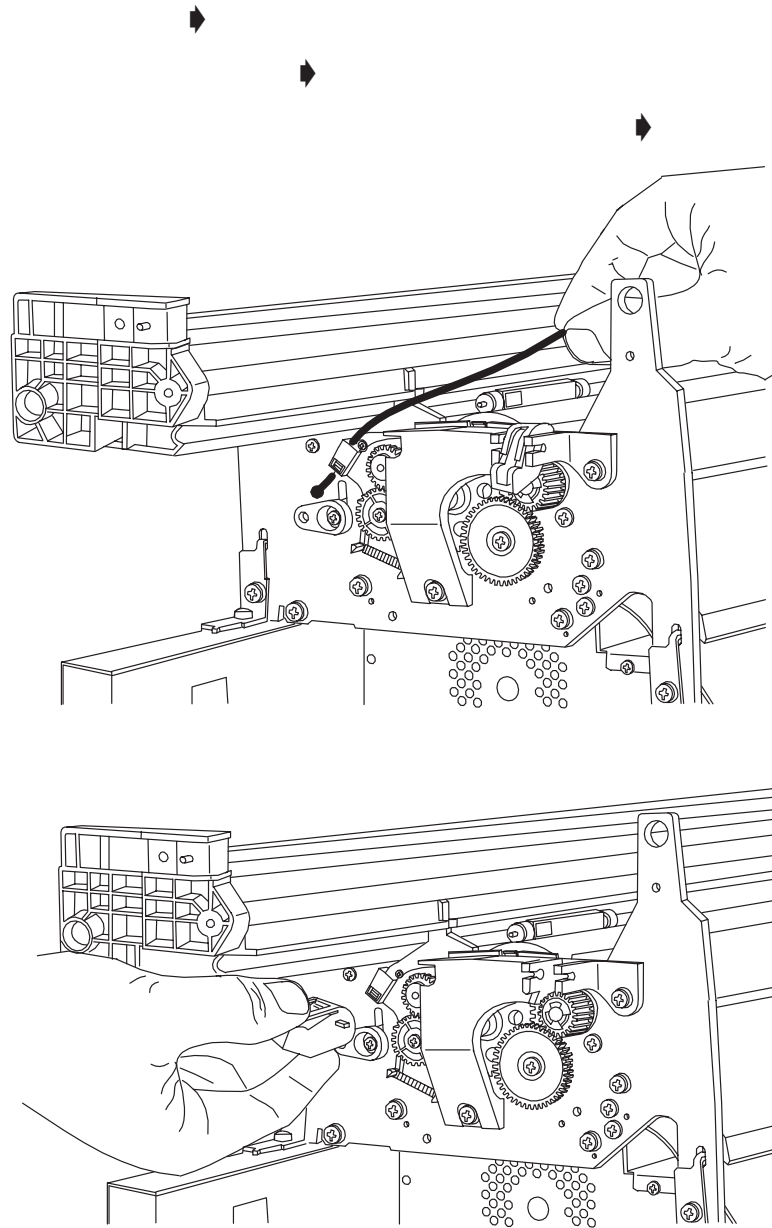


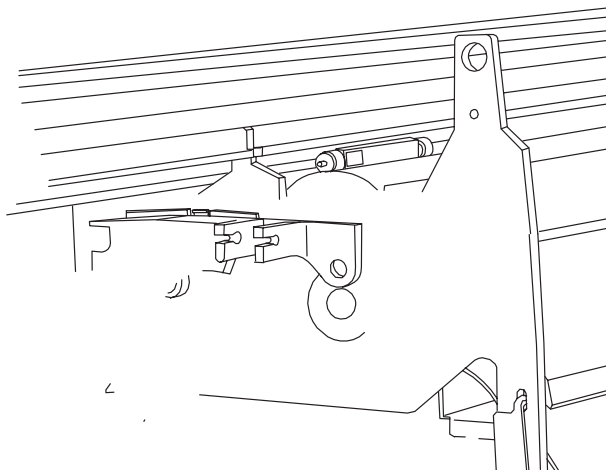
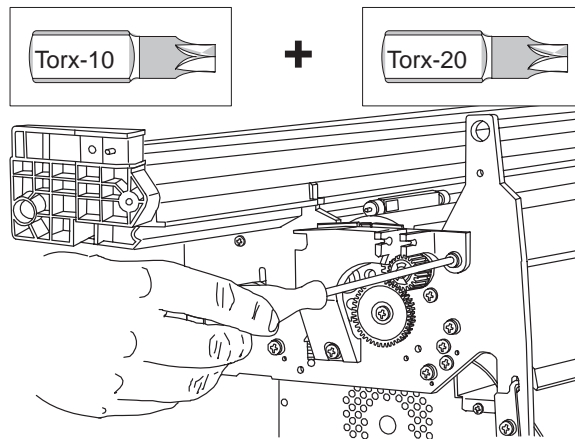
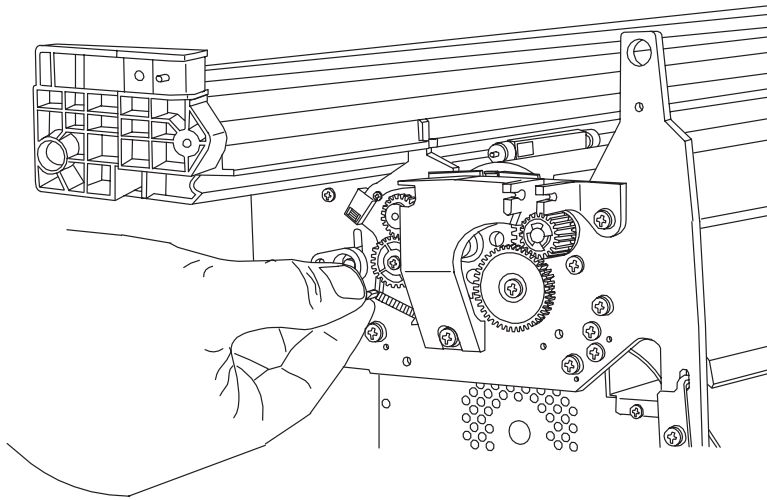
*The cam falls to the floor of the Printer.*



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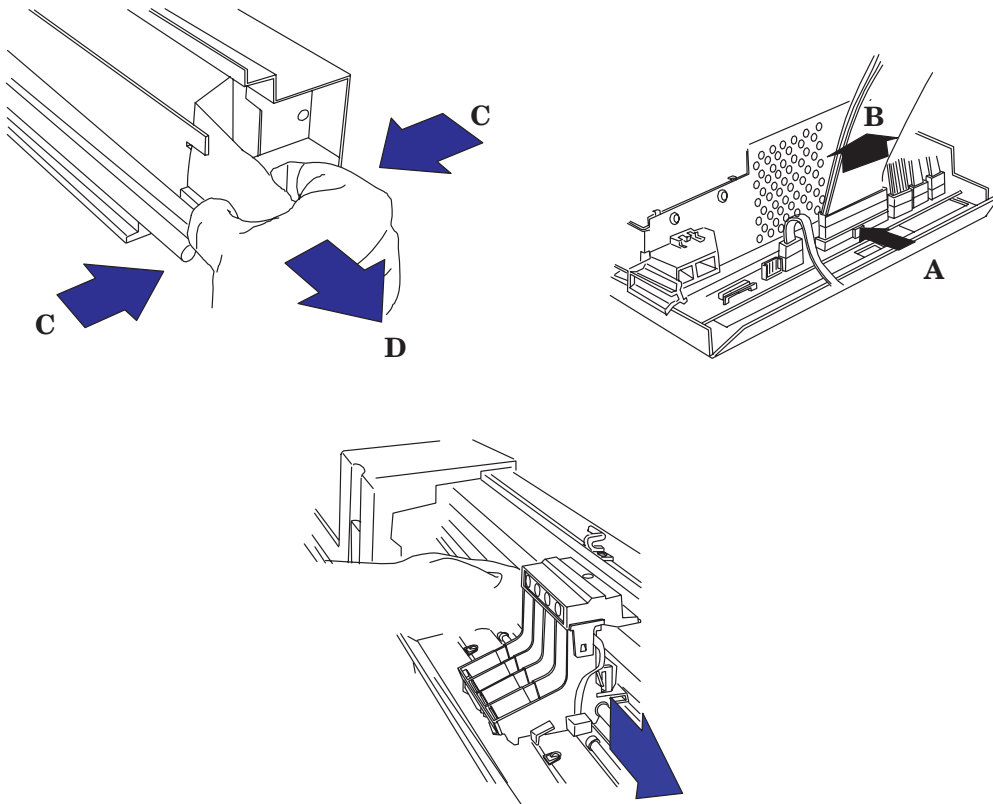
## Removal

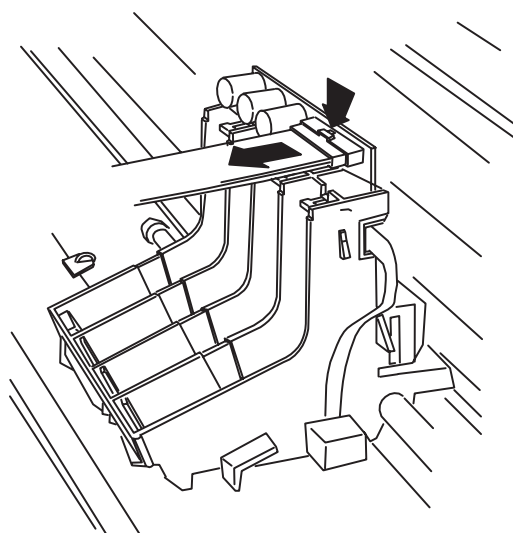




---

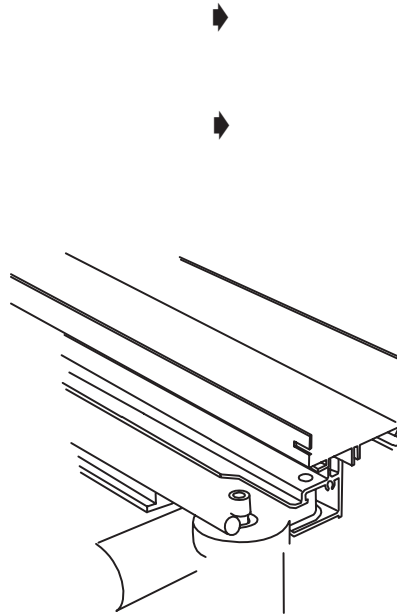
## Removal





---

## Removal



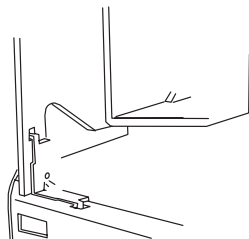
---

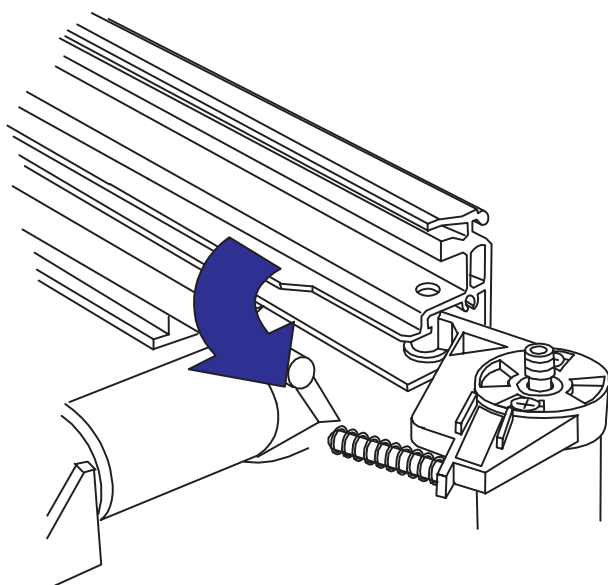
## Removal



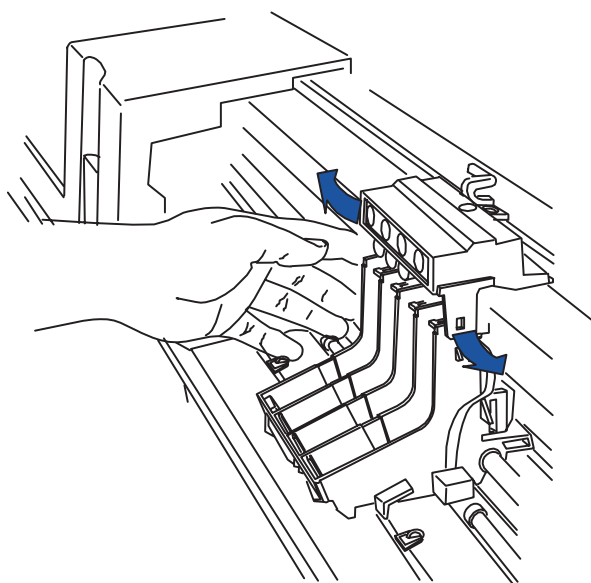
*In the following step, take care not to break the black plastic tab on top of the motor.*

*If you need greater maneuverability of the motor, press the black plastic tab on the top **very slightly** downwards.*

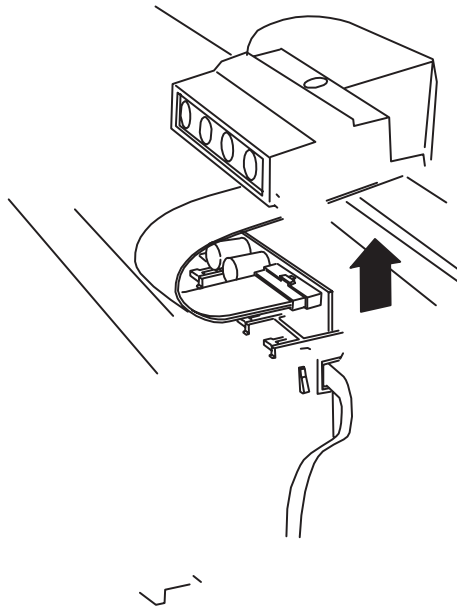


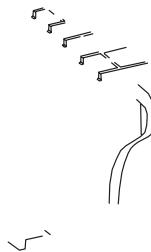


***Reassembling:*** Make sure the belt is correctly positioned on the grooves of the pulley.









---

## Removal



**Reassembling:** Clip the belt to the carriage, using the same part of the belt as was originally used. Also, match the vertical lines on the belt with the vertical grooves on the carriage. The horizontal lines on the belt face outwards.

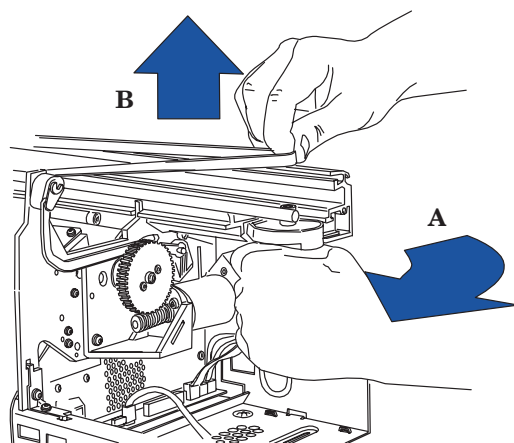
---

## Removal

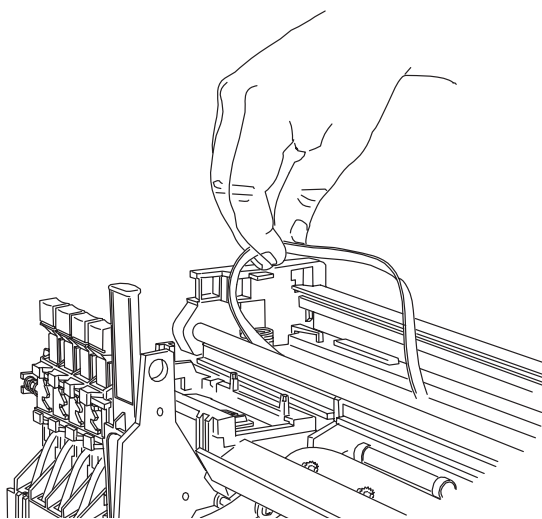


*In the following step, take care not to break the black plastic tab on top of the motor.*

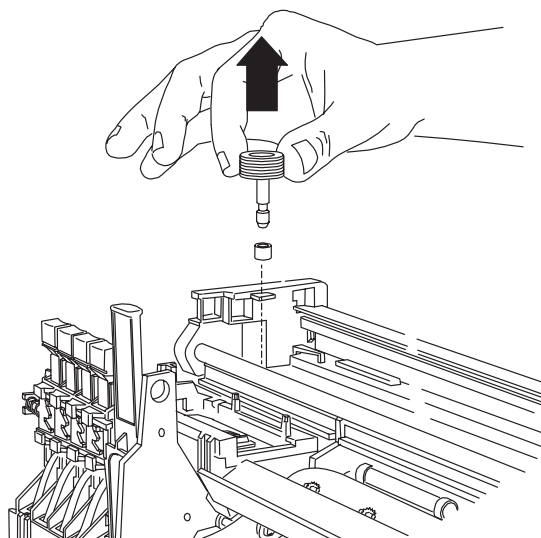
*If you need greater maneuverability of the motor, press the black plastic tab on top **very slightly** downwards.*



**Reassembling:** *Make sure the belt is correctly positioned on the shaft grooves.*

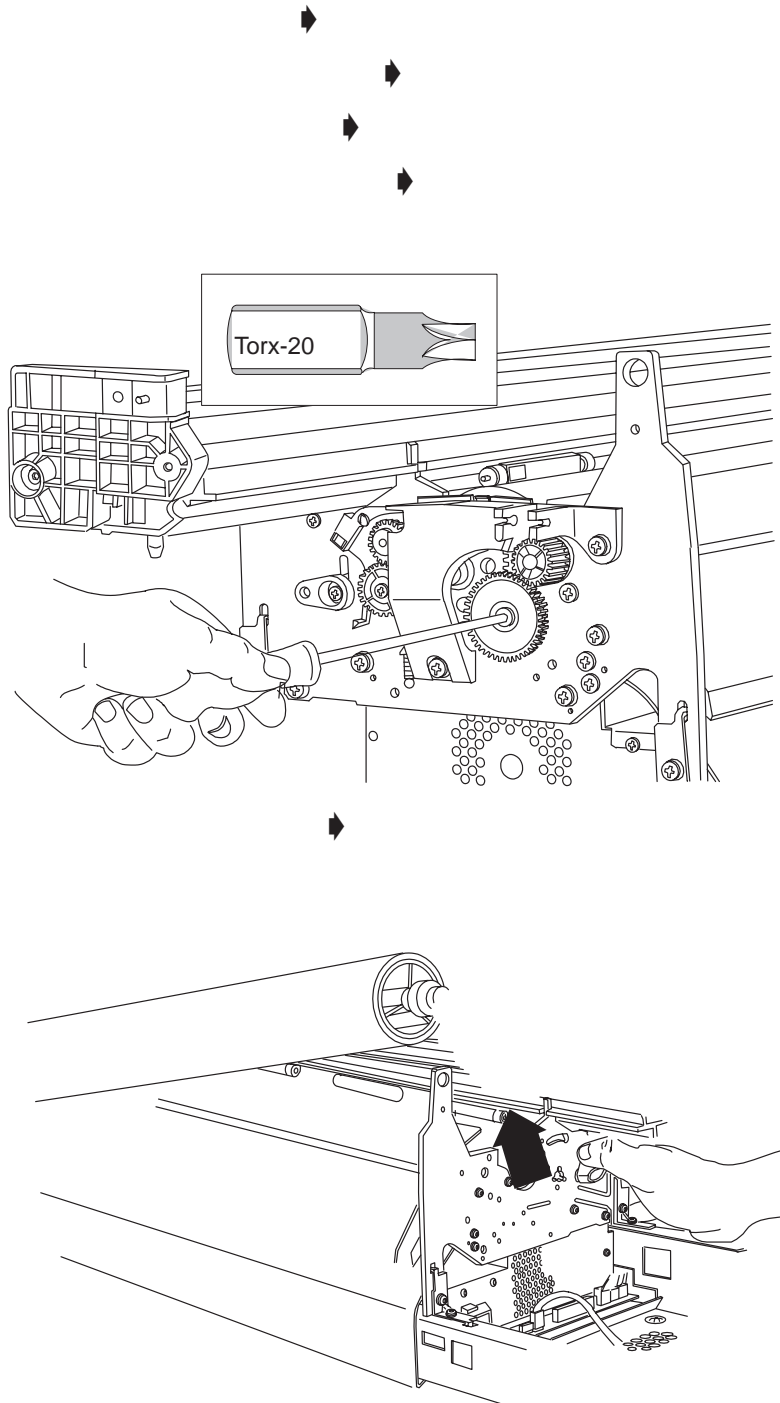


**Reassembling:** Make sure the belt is correctly positioned on the pulley grooves.



---

## Removal

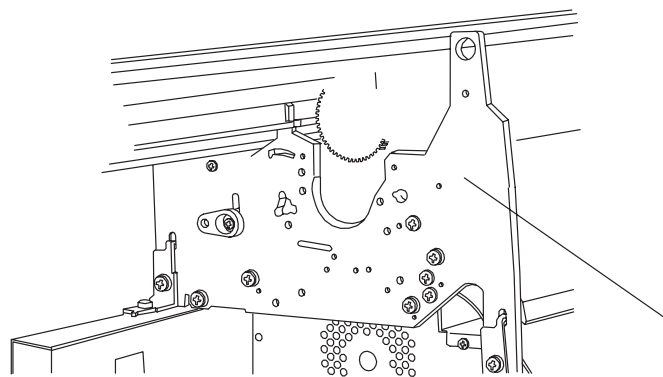
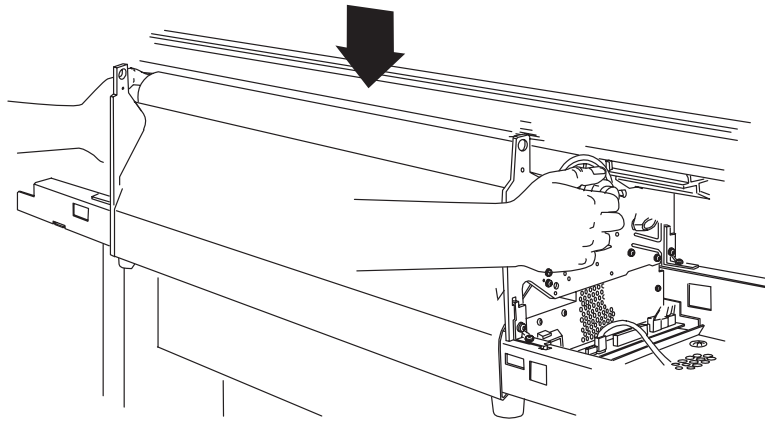


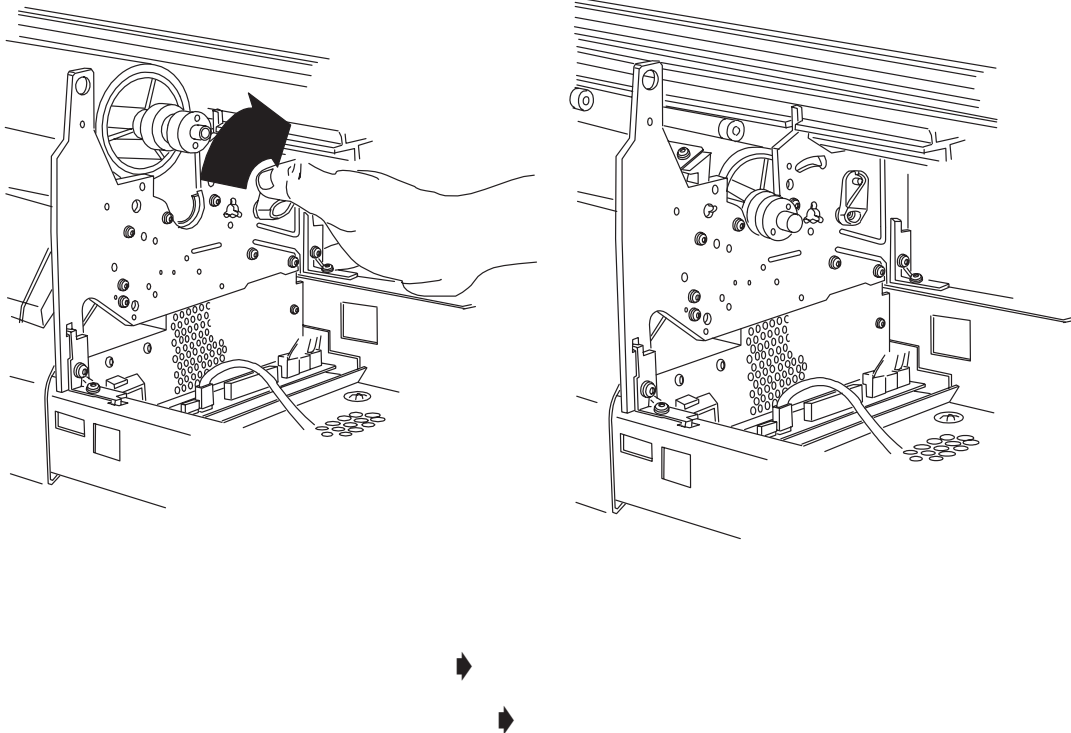
---

***In the following procedure, take care not to injure your fingers if you let the drive roller snap into place.***

*In the following procedure:*

- 
- 





*Press down on the media mount as you replace the three screws. This is to ensure correct spacing between the drive roller and the cartridge nozzles.*

**Calibration:** *Perform the accuracy calibration after reassembling the Printer. (Details ▶ chapter 5.)*



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*Refer to figure 10* ➤

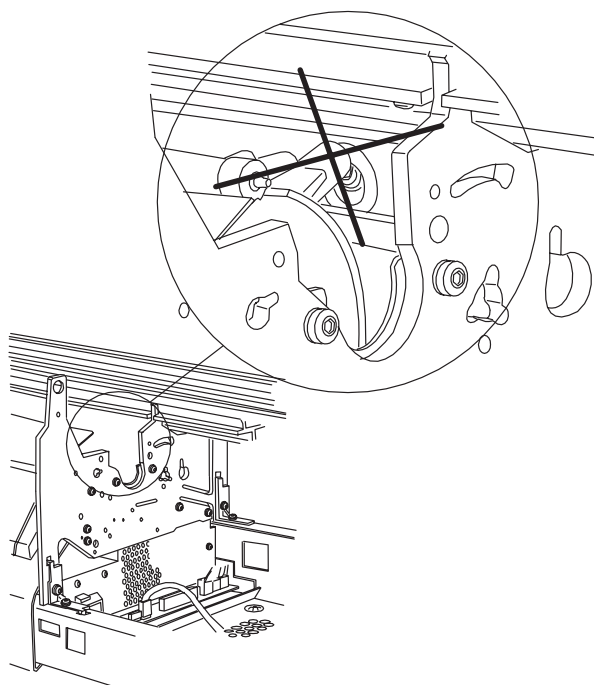
## **Removal**



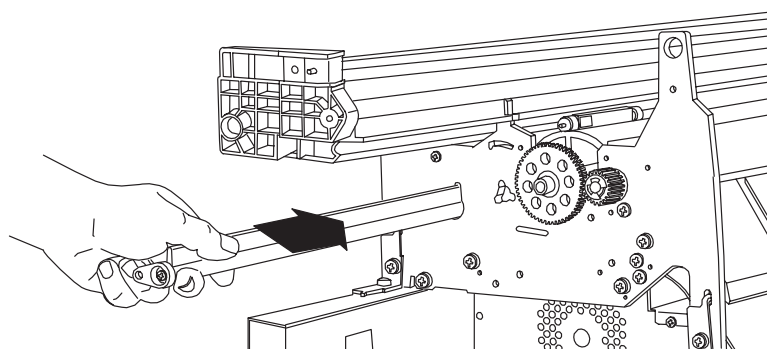
**nut**



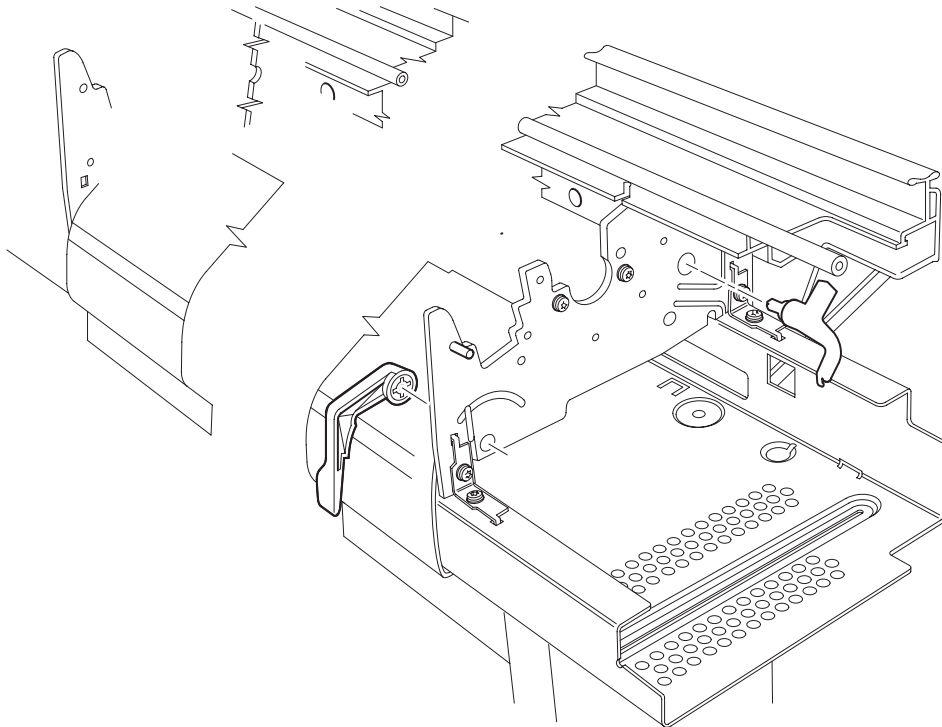
## Installation



*between the left and right side-plates, or the lift mechanism will not work.*



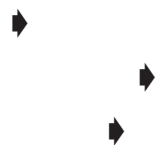
*In the following step, do not overtighten the cam-journal screw. Doing so could break the journal, cause the bar cam to enter the side-plate hole, and thus restrict the action of the pinch-arm lever.*

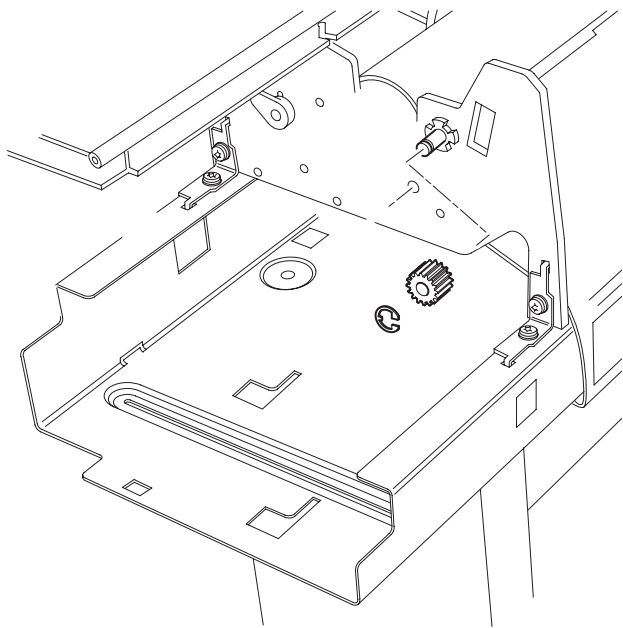


---

*Refer to figure 11* ➤

## **Removal**

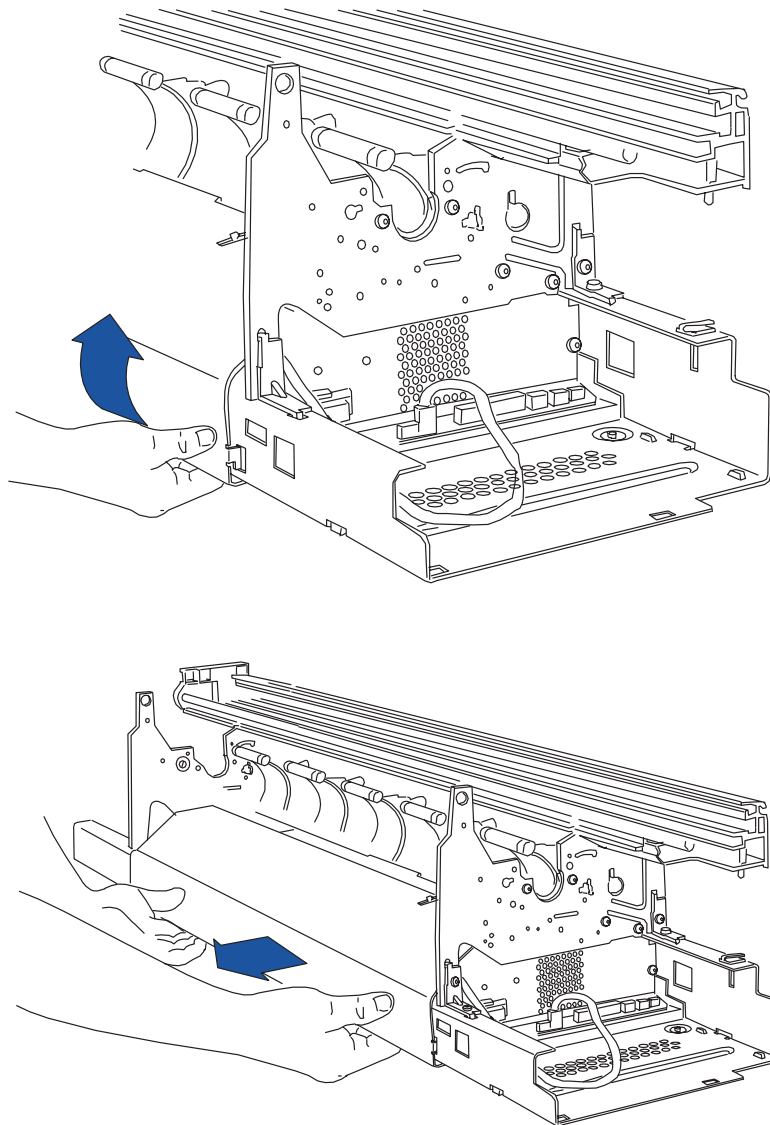




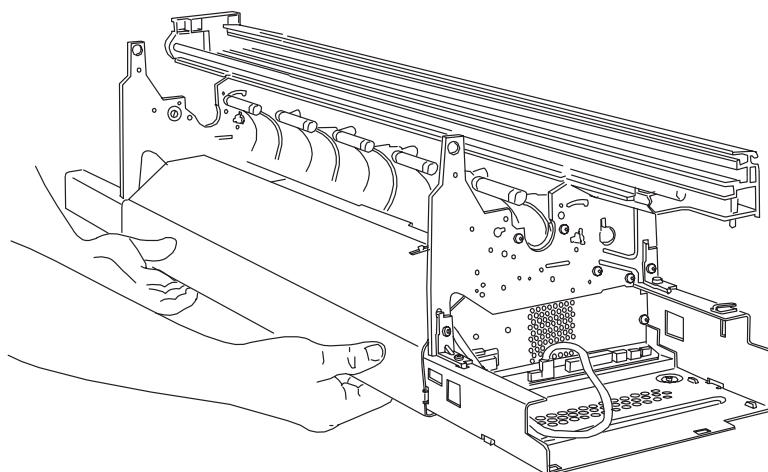
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*Refer to figure 12* ➡

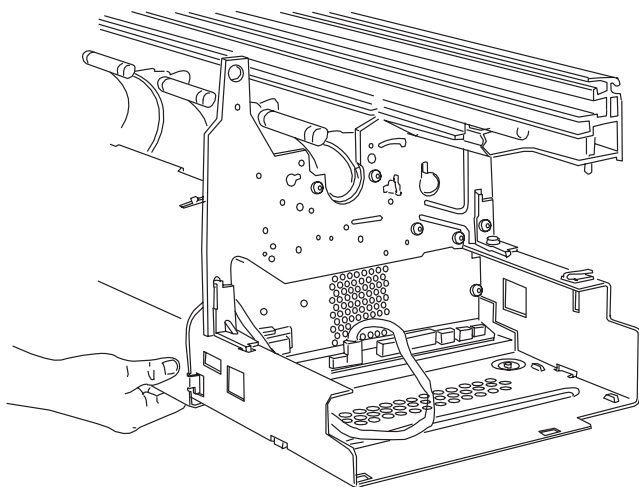
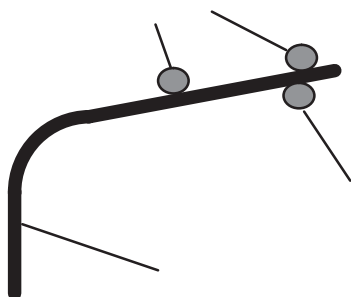
## Removal



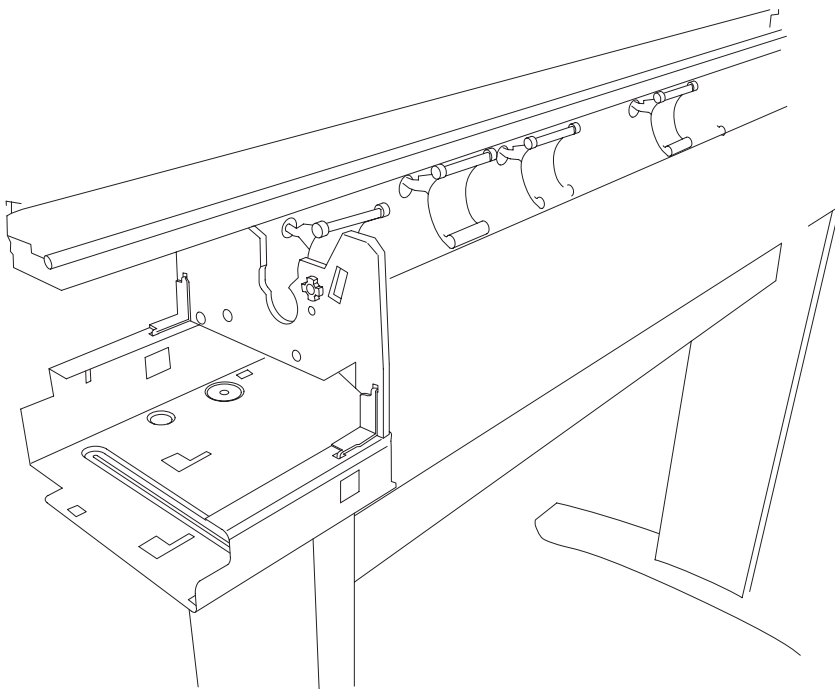
## Installation



*On each side-plate, the **upper** two pins should touch the entry platen above it and the lower pins should touch the entry platen below it.*



*There must be no space between the entry platen and the **right** side-plate. It doesn't matter if there is a small space between the entry platen and the **left** side-plate.*







**\_\_\_\_\_** \_\_\_\_\_

**\_\_\_\_\_** \_\_\_\_\_

Average number of plots per day	Maximum number of plots per day
10 E/A0 CAD plots	20 E/A0 CAD plots



**\_\_\_\_\_** \_\_\_\_\_

±

**\_\_\_\_\_** \_\_\_\_\_



---

## **WARNING**

**Disconnect the Printer from the power source prior to performing any cleaning. DO NOT allow liquid to run on to electrical components or circuits, or through openings in the enclosure, as this can create a shock hazard leading to death or injury.**

## **General Cleaning**

**1**

**2**

**3**

## **Cleaning the Drive Roller**

**1**

**2**

**3**

**4**

**Form Feed**

**5**

**disconnect it**

**6**

**7**

**8**

**9**

**10**

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Manual,”      ▶ “*HP DesignJet 220 and HP DesignJet 200 Printers – Service*  
*Service Manual,*”      ▶ “*HP C2858B/C2859B DesignJet 650C*

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- 
-



**Pinch-Arm Sensor**



**Bail**

**Bail-Lift Mechanism**



**Line Sensor**

- 
- 
- 
-

---

## Carriage-Drive Mechanics

### Motor, Belt and Pulley

- 2
- 2 2
- 
- 
- 2

### Carriage Guidance

2

### Positional Feedback

- 
- - 
  - 
  -

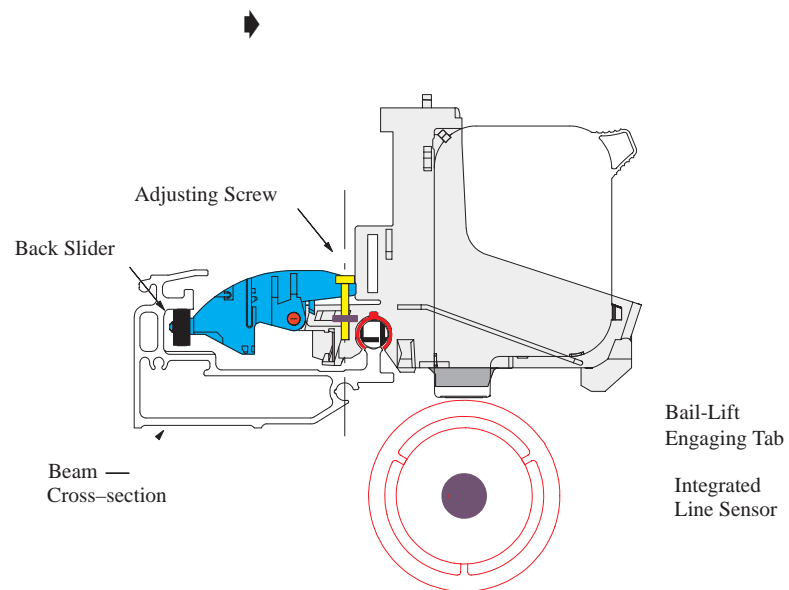
2



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## Print Cartridges

### Distance between Carriage and Media



---

## Service Station

- 
- 
- 
- 
- 
- 

## Spittoon

## Primer

- 
- 



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## **Sensors**

- **cover sensor**
- **media sensor**
- **line sensor**
- **pinch-arm sensor**

## **ROM**

## **RAM**

## EEROM

## Input/Output Interfaces

*JetDirect EX*    *HP JetDirect EX Plus3*    *HP*

## Bi-Tronics

## RS-232-C

## Power Supply

---

**W A R N I N G**    The primary side of the power supply contains rectified line voltage that can be lethal when touched even if the ON/OFF switch is OFF.

---

In any case, you should not need to open the electronics module. It is one exchangeable part.

## Water Condensation

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## **Plot Orientation**

## **Raster Image Processor**

**no negative motion**

**flow mode**



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<b>#</b>	<b>centronics</b>
<b>°C</b>	<b>checkout</b>
<b>°F</b>	<b>checksum</b>
<b>A</b>	
<b>ac</b>	<i>The Harper Collins Dictionary of Computer Terms</i> ©
<b>accuracy calibration</b>	<b>cm</b>
<b>addressable dpi</b>	<b>Customer Engineers</b>
	<b>D/A1-size plotters</b>
<b>ASIC</b>	<b>data display</b>
<b>baud rate</b>	<b>dB</b>
	<b>dc</b>
<b>bidirectional print mode</b>	<b>depletion</b>
<b>binding</b>	<b>display data</b>
<b>Bi-Tronics</b>	<b>display list</b>
<b>°C</b>	
<b>CAD</b>	<b>DOS</b>
<b>calib.</b>	<b>dpi</b>
<b>CAM</b>	<b>DRAM</b>
<b>carriage axis</b>	<b>drive roller</b>
<b>carriage LED</b>	<b>drive-roller gear</b>
<b>cartridge</b>	



**driver**

*Webster's Ninth New Collegiate Dictionary* ©

**DTR**

**duty cycle**

**E/A0-size plotters**

**ECP**

**EEROM**

**electronics module**  
*electronics enclosure*

**EPROM**

**ESD**

**°F**

**film**

**flow mode**

**ft**

**half-toning**

**helical gear**

**HP**

**HP-GL**

**HP-GL/2**

**HP-RTL**

**Hz**

**IC**

**IEEE**

**in**

**I/O**

**IPA**

**ips**

**K**

**Kana-8**

**Kanji**

**Kbyte**

**kg**

**Kg**

**LAN**

**lb**

**LED**

**line sensor**

**m**

**margin**

**Mbyte**

<b>media</b>	<b>parity</b>
<b>media axis</b>	<b>pass</b>
<b>media jam</b>	<b>pass advance</b>
<b>media-jam lever</b>	<b>PC</b>
<b>media-length calibration</b>	<b>PCA</b>
<b>media-sensor calibration</b>	<b>pen</b>
<b>mil</b>	
<b>minimum pass time</b>	
<b>MIO</b>	<b>pinch-arm lever</b>
<b>mm</b>	<b>PJL</b>
<b>monitor mode</b>	
<b>MS-DOS</b>	
<b>no negative motion</b>	<b>platen roller</b>
	<b>plot quality</b>
	<b>PML</b>
<b>off-axis ink system</b>	<b>P/N</b>
	<b>power cycle</b>
<b>PAL</b>	
<b>palette</b>	<b>primary colors</b>
	<b>print quality</b>
<b>paper axis</b>	<b>Product Line 30</b>

**PWM**

**RAM**

**raster**

**raster image processor**

**relative humidity**

*Webster's  
Ninth New Collegiate Dictionary*  
©

**resolution**

**rms**

**ROM**

**roman**

**RS-232-C interface**

**RTL**

**sec**

**secondary colors**

**service monitor**

**SIMM**

**skew**

**special paper**

**SPROC**

**swath**

**Best**

**Fast**

**Normal**

**TCP/IP**

**theta-Z error**

**translucent**

**TTOE**

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**unidirectional print mode**

**vellum**

**VLS**

**X-axis**

**X-axis calibration**

**Y-axis**





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## About This Edition

*HP C4713A, 4714A, 4715A, 4715A, C6080A and C6081A  
HP DesignJet 430, 450C and 455CA Service Manual*



## **What's in This Book**

This manual contains information necessary to test, calibrate and service

- HP DesignJet 430 printers  
(models C4713A and C4714A)
- HP DesignJet 450C printers  
(models C4715A and C4716A)
- HP DesignJet 455CA printers  
(models C6080A and C6081A)

For information about using these printers, refer to the corresponding user and quick-reference guides.

The procedures described in this manual are to be performed by HP-qualified service personnel only.